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ON THE RELATIVE VALUES OF THE VARIOUS SURGICAL METHODS OF TREATING UTERINE FIBROIDS.[1]

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There is nothing which in an equal degree marks in gynecology the boundary line between the old order of things and the new as the recent discussions upon the surgical treatment of uterine myomata.

Not many years ago we preached to a patient with a myomatous growth the virtues of fortitude and resignation; we comforted her with figures showing the statistical frequency of the disease, and with the assurance that it was not "malignant;" and we held out the hope that the progress of the tumor would be arrested by the occurrence of the climacteric. Now when we compare these sterile beginnings with the present completeness of our resources we realize, as never before, the possibilities that lay hidden twenty years ago under the teachings of Lister.

Perhaps no achievement in surgery has ever borne witness so completely to the triumph of human ingenuity over anatomical difficulties as the safe extirpation of the enlarged uterus; and it is with special pride that I am able to point to the highly creditable part played by members of this Society in bringing the operation to its present perfection. But in the midst of the new hopes and enthusiasms awakened by recent records of successes in the field of hysterectomy there are a number of important questions which, in the heat of debate, have been treated in a step-mother fashion. Now it is my hope that I may be ful-

[1] Read before the American Gynecological Society, Washington, May, 1894.

filling a useful function if I call attention to certain of these, and ask concerning them the expert opinions of the representative men I have the honor of addressing.

Thus it has seemed to me, in following the reported triumphs of the past three years, that certain features in the biology of fibromata ought not to be forgotten. For instance, we are all agreed, I think, at least those of us who have been engaged in general practice (for the pure specialist is apt to see only cases that have exhausted the resources of the general practitioner), that myomata may remain of small size for many years, or for a lifetime; or in rare instances they may diminish in size or even disappear without treatment. In the latter category Albert Doran[1] reports thirty-seven cases. In thirteen spontaneous disappearance followed pregnancy, in six disappearance was associated with inflammations, and in eighteen cases (ten preceding and eight cases subsequent to forty-five years of age) there was no parallel circumstance to which the change could be attributed. So, too, Vineberg[2] has reported notes of a case of a fibro-myoma which entirely disappeared after a single curettement.

If, therefore, the uterine growth is of small size and the pain and vesical discomfort are slight, is it not good practice to delay a little, and to control, if need be, an attendant menorrhagia by the curette, by the tampon, by ergotin, or by the methods of Apostoli?

The argument in favor of more radical measures, because of the supposed liability of myomata to malignant changes, especially in patients nearing the climacteric, clinically has not much weight. Kleinwächter[3] reported a few years ago the case of an elderly maiden lady who carried a fibroid forty years, which at the end of that time became carcinomatous. Quite recently Geier[4] has collected ten cases of primary carcinomatous degeneration of myomata; but of these he regarded only four as beyond question. There were, however, forty-six cases which had been reported of the simultaneous, but independent existence of carcinoma and myoma—*i. e.*, as was to have been expected, the one condition does not serve as a prophylactic against the other.

Of the palliative measures, the curetting unquestionably furnishes the greatest number of disappointments. Semb,[5] in an article based upon the analysis of twenty-two cases, reaches the conclusion that the hemorrhages associated with myomata are due less to changes of the

[1] Albert Doran: "On the Absorption of Fibroid Tumors of the Uterus, with the Report of a Suspected Case," Trans. Obstet. Soc., London, 1893, p. 250.

[2] Vineberg: N. Y. Journ. Gynecol. and Obstet., September, 1892.

[3] Kleinwächter: "Zur Biologie der Fibro-myome des Uterus," Ztschr. für Geb. und Gynäk., Bd. xxv. p. 164.

[4] Geier: Centralblatt f. Gynäk., April 7, 1894, S. 341.

[5] Semb: "Ueber das Verhalten der Uterus-Schleimhaut bei Myomen," Arch. für Gynäk., Bd. xlvii. S. 200.

endometrium than to the enlargement and increased vascularity of the uterine walls.

In the early winter I saw with Dr. Bryant a patient suffering from excessive menorrhagia, caused by a submucous fibroid of about the size of an infant's head. The cervix was dilatable, and the tumor could be readily reached and explored by the finger. The woman was fifty-three years of age, and was so reduced by hemorrhages that she could not turn in bed without assistance. First the curette and then galvanism were resorted to, but without avail. Both Dr. Bryant and myself then advised hysterectomy, though the enfeebled condition of the patient compelled us to give a guarded prognosis. The husband, however, declined to sanction any operative measure. As a means of temporary relief, therefore, I employed daily, first, a combined uterine and vaginal tampon of iodoform gauze, and then a vaginal tampon only. By this means the hemorrhage was arrested. At the end of eighteen days the treatment was discontinued. Three months have since elapsed. The patient is at present in the enjoyment of excellent health; the hemorrhages have ceased, the cervix has closed, and the tumor has diminished to half its size.

In a series of investigations concerning the origin of fibroids, made in the early stages of this growth, Gottschalk[1] concludes that the nucleus is furnished by changes in the convoluted portions of the uterine artery. He agrees with Virchow, Gusserow, and Winckel that every form of local irritation which produces continuous circulatory disturbances acts as a predisposing cause.

The growth of the tumor is largely peripheral, and is maintained by the vessels distributed over the outer surface. He believes that both in preventive and curative treatment profit can be derived from the fact that myomata thrive only in hyper-nourished tissues, and have their origin in close connection with the arterial vessels. In the early stages he recommends, therefore, the ligating of the uterine arteries through the vagina. In September, 1892, at the International Gynecological Congress, at Brussels, he reported three cases treated in this way. In one the tumor had disappeared altogether; in the two others there had been a marked diminution in size; and in all the improvement in the general condition had been very decided.

In December, Franklin Martin, without knowledge of Gottschalk's work, read a paper before the Chicago Gynecological Society, advocating the vaginal ligation of the uterine arteries, and reporting two cases in which the experiment had been tried. Since then he has operated upon six additional patients. In all the results have been most satisfactory. He writes me (April, 1894), "the tumors have all been markedly

[1] Sigmund Gottschalk: "Ueber die Histogenese und Aetologie der Uterus-Myomen," Arch. für Gynäk., Bd. lxiii. S. 534.

reduced in size; the hemorrhages have ceased; the pressure-pains have been relieved." Boldt[1] has likewise reported a case where a tumor the size of a hen's egg had entirely disappeared eight months after ligation.

Now it seems to me unwise bigotry to ignore such testimony because the vaginal ligation of the uterine arteries belongs in the domain of little things. The fact that to a woman the loss of her generative organs is attended with a sense of personal inferiority ought never to be lost sight of in gynecological practice. No woman likes to feel that she is "different" from others, and she cares nothing for the statistics of the successful operator.

In this connection the question arises whether sufficient attention has been paid in this country to the large amount of efficient work that has been accomplished abroad in connection with the enucleation of fibroids by the vaginal passages.

Of course, I do not mean to ignore the valuable work upon the same lines by Drs. Atlee, Sims, Emmet, Thomas, and others at home; but it is to the extension of the method, and to the relative safety with which it can now be performed that I would particularly call attention. Chrobak[2] alone reports forty-three cases with only one death. The tumors were cervical, submucous, and interstitial. They varied in size from a child's fist to a child's head. From his most interesting paper I gather the following details: The cervix needs to be dilated sufficiently to admit volsella forceps and a guiding finger—sufficient dilatation for two fingers is convenient but not indispensable. The uterus should be drawn down to the pelvic floor by volsella, which should seize the cervix as high up as the vaginal junction. The tumor should then be grasped by volsella forceps, the capsule should be divided, and the enucleation should be proceeded with by the finger, aided, if need be, by blunt-pointed scissors. Where difficulty is experienced in extracting the tumor through the cervix it can be elongated by a series of clippings upon opposite borders, or by a spiral incision around the growth. By either method a tumor the size of the fist can be converted into a body not unlike an apple paring.

After reading Chrobak's report I had occasion to try the method upon a patient suffering from a submucous fibroid the size of a large orange, which was situated at the fundus. The patient was greatly reduced by pain and hemorrhages. The enucleation was effected by one finger and with blunt-pointed scissors. The operation was a slow one, lasting about an hour and a half, but seemed to require for its successful performance

[1] Boldt: "Ligation of the Uterine Arteries for the Cure of a Fibro-myomatous Tumor of the Uterus," N. Y. Journ. Gyn. and Obst., Feb., 1894, p. 129.

[2] Chrobak: "Ueber die Vaginale Enucleation der Uterus-Myomen," Sammlung klinische Vorträge, Neue Folge, No. 43.

little more than patience and a determination to succeed. The patient is now a well woman, in the possession of all her organs.

I have thought it worth while to refer to this case because, while Edebohls and Dudley, at the time I showed the specimen to the members of the New York Obstetrical Society, related similar histories from their own practice, the patient, before visiting me, had previously consulted one of our most skilful and conservative gynecologists, who declared that relief could only be secured by abdominal hysterectomy.

The operation is, of course, applicable only to tumors of small size. It would be contra-indicated in multiple and subserous fibroids, by inflammatory conditions, and in fixation of the uterus by old adhesions. Great care needs, therefore, to be taken in the prefatory diagnosis. Not only should careful bimanual examination, best under ether, be employed, but the cervix should be sufficiently dilated to permit the most thorough digital exploration of the uterine cavity. Nor is it to be forgotten that the good results which have restored the method to favor are due to aseptic methods. During the operation nearly continuous irrigation of the uterine cavity should be employed, and at its completion the emptied sac should be carefully packed with iodoform gauze.

Doubtless more ready access to the tumor may be obtained by a resort to the plan devised by Péan. Instead of preliminary dilatation, he advises a circular incision through the vaginal walls above the cervical attachment, high separation of the cervix from the surrounding tissues, with avoidance, however, of the peritoneum; arrest of hemorrhage by forcipressure, and bilateral incision of the cervix, or, if need be, of the lower uterine segment. The anterior and posterior portions are then seized, each with volsella forceps, which serve as a means both to draw the uterus downward and to separate the flaps in such a way as to expose the tumor to be operated upon to the sight as well as to the touch. The fibroid should then be removed entire, or by "morcellement." Afterward the cervix and surrounding tissues may be restored *ad integrum* by familiar plastic methods.

There is no doubt that the plan of Péan is "surgical," but in the absence of reassuring statistics it would seem open to question whether the indications would not be met with greater safety to the woman by a resort to hysterectomy.

When radical measures are deemed necessary it seems to me that, where practicable, vaginal hysterectomy should take precedence of the abdominal form. While granting that much can be accomplished by the perfected technique of the finished operator to lessen the objections to abdominal section, we all know that there are drawbacks inseparable from the method. It may seem a little thing, but every woman dislikes the disfigurement of the cicatrix. The newer devices for approximating the cut surfaces diminish the frequency but do not guarantee against the

occurrence of hernias. Thus, in Jacob's clinique, there were 259 cases, with 38 hernias, 12 of which later required operation. Gollet had 93 cases, with 16 hernias, 11 of which required operation. Similar reports are received from every source where statistics are kept on a large scale and conveniences exist for following up the later histories of those who have been subjected to cœliotomy. Even those of us who feel quite sure that the accident does not occur in our own practice have often performed the secondary operation upon the patients of others. Again, along the line of the incision there are always adhesions of the omentum and intestines to the abdominal wall. By the vaginal method better drainage is secured, the recovery is more rapid, and the patient is spared the shock and abdominal distention due to prolonged handling and exposure of the intestines to the air.[1]

But the results of vaginal hysterectomy in the treatment of fibroids are especially remarkable. Landau[2] reports 38 cases operated upon by Richelot, with one death; 28 cases by Doyen, with one death; 22 cases by Jacobs, with no death; and 300 cases by Péan, with 6 deaths, or on the part of experienced operators 8 deaths in 388 cases. It is impossible to ignore such a showing. No matter how expert the cœliotomist may have become in his own line he must give his attention to the latest improvements in scientific surgery. At first it would seem strange that a method which can boast such successes should have received scant attention from American gynecologists. In the past the hesitation has probably in part been due to a latent incredulity, to the need of an extensive new equipment, and to the fact that a method which requires to be constantly adapted to varying conditions lends itself imperfectly to written descriptions. Henrotin and Engelmann, after witnessing Jacob's work at Brussels, at the time of the Gynecological Congress, in 1892, returned complete converts.

For tumors of median size, vaginal hysterectomy appears to offer every advantage. The various devices for reducing the size of the uterus from below, viz: morcellement, conoidal excision, and enucleation extend its capabilities almost indefinitely. Yet it is questionable whether there is an advantage to be gained by substituting the vaginal for the abdominal method in tumors of larger growth. The operation then becomes a lengthy one, is attended with considerable risk, and possesses repellant features in marked contrast with the beautiful technique of an abdominal hysterectomy.

When the tumor much exceeds in size a child's head, experience teaches that it is, as a rule, advantageous to attack it from above. When the abdominal cavity has been exposed, and the tumor is of medium size,

[1] Landau: "Ueber Abdominale und Vaginale Operations verfahren," Arch. f. Gyn., Bd. xlvi., p. 103.

[2] Landau: Loc. cit., p. 131.

the question of castration is a legitimate one, though in the last two years it has been the fashion to discredit it.

Baldy[1] expresses the modern feeling when he says: "The uterus is a useless organ in all cases where the ovaries and Fallopian tubes have been removed, and is only too frequently a source of discomfort, invalidism and death." But in the treatment of fibroids it must be acknowledged that it can be made to serve the useful though humble function of a stop-gap, and some of us have been less unfortunate than he in the subsequent ills castration has entailed upon our patients.

Martin,[2] who was one of the first to abandon the removal of the ovaries in the treatment of uterine fibroids, has been more guarded in the statement of his reasons. He prefers hysterectomy because he regards the removal of the *materia peccans* as more correct in principle. He had noticed too, that in instances where the ovaries and tubes had been removed for other causes, menstruation sometimes persisted, and that hemorrhages and the growth of the fibroid sometimes continued after the climacteric, but in the seven cases in which he resorted to castration for fibroids he states that he was "certainly contented with the results."

Münchmeyer,[3] writing from Leopold's clinic, like Martin, is disturbed in castration by the roundabout method of attaining his ends. Yet castration he found was usually followed by benefit, and lasting benefit, too. Failures he attributed to the incomplete removal of the ovary owing to the existence of extensive adhesions.

Cholmogoroff,[4] while advocating total extirpation as a method of choice, agrees that castration is usually successful, though it may fail because particles of ovary are left behind.

Leopold[5] reports twenty-four cases which survived the operation. In twenty-two menstruation was immediately suspended. In one it continued for several periods. In one, a case of cervical fibro-myoma, it persisted, but was diminished in amount. In nearly all the cases shrinkage of the tumor was noted.

From Gusserow's clinic Neidhardt[6] reports 38 recoveries from the operation. Amenorrhœa was produced in 36 cases (in four after several recurrences of the menses). The myomata had diminished in size in 30 cases. In 29 instances the patients expressed themselves as feeling perfectly well. In 2 cases only no improvement was experienced.

[1] Baldy: "Hysterectomy—Indications and Technique," Amer. Journ. Obstet., 1892, vol. xxviii, No. 5.

[2] Martin: "Ueber Myomoperationen," Zeitschrift f. Geb. u. Gyn., Bd. xx. S. 9.

[3] Münchmeyer: "Ueber die Endergebnisse und weitere Ausdehnung der Vaginalen Total Extirpation der Gebärmutter," Arch. f. Gyn., Bd. xxxvi, S. 424.

[4] Cholmogoroff: "Ueber die Auwendung, der Vaginalen Total Extirpation des Uterus bei interstitialen Fibromen," Zeitschrift f. Geb u. Gyn., Bd. xxvii. S. 56.

[5] Leopold: "Die Operative Behandlung der Uterusmyome," etc., Arch. f. Gyn., Bd. xxxviiii. S. 29.

[6] Neidhardt: Resultate nach Castration der Frauen bei Myomen des Uterus. Berlin, 1893.

Mendes de Léon reported 19 cases to the International Society of Gynecology and Obstetrics. Two were of recent date. Of the other 17 the results in 16 were satisfactory.

Lawson Tait returned 327 histories of castration for myomata. From later reports from the patients, or from their physicians, he learned that 311 were relieved of their distressing symptoms.

While writing upon this subject five of my own patients accidentally have called upon me. All had been operated upon because of large tumors. I asked them eagerly how far they were suffering from "discomfort or invalidism;" but they all insisted that they felt very well.

Of course hysterectomy may be the method of the future. Castration is no longer advocated in large tumors, in cystic tumors; and there is a question as to its value in tumors occupying the lower zone, which are mainly fed by the uterine arteries. It should not be attempted where, owing to extensive adhesions, the removal of the ovaries cannot be made complete. Under favorable conditions, extirpation complete or partial, is probably the wiser course; but cases will occur where excessive anæmia, a feeble circulation, or the length of time needed to separate adherent viscera, may incline the operator to the milder procedure; or, *crede experto*, he may take to heart the kindly warnings of the Coryphei that hysterectomy is not for tyros, and then may derive comfort from the knowledge that it is not necessary to entertain too gloomy a view concerning the outcome of castration.

In all cases where the abdomen has been opened the question of the possible saving of the uterus and its appendages ought never to be lost sight of. All pedicled growths should be tied and removed. Martin, who, like Polk with us, has taken a leading part in urging conservative pelvic surgery, reports in the last edition of his *Frauen-Krankheiten*, that up to the end of 1892 he had employed enucleation as a sequence to cœliotomy in 139 cases, with a loss of 26 patients (11.5 per cent). The death rate, to be sure, is heavy, but many of the fatal cases were due to the defective indications incident to a novel operation. Thus, in 24 instances, the uterine cavity was opened, and in 8 of these death occurred. In 72 instances, where the uterine cavity was left intact, there were 10 deaths; but 5 of the operations were performed upon pregnant women. While a subserous fibroid of medium size can be usually removed with minimal risk to the life of the patient, and with complete relief to her sufferings, it would no longer be thought wise to employ enucleation in pregnancy nor in tumors of large size which involve the uterine area to any considerable depth. A relapse occurred in only 3 of the 113 recoveries. Forty-six per cent. of the number were unmarried, and 27 per cent. were past 40; but pregnancy occurred in two of the cases, and the normal functions were preserved in all.

But after other methods have been weighed there will always remain

cases where the size of the tumor, where cystic degeneration, where the multiplicity of the growths, where the situation in the pelvic cavity, or between the folds of the broad ligaments, make it necessary to remove the uterus from above where every step in the operation can be controlled by the guidance of the eye.

For a long time, under conditions requiring hysterectomy, the extra-peritoneal treatment of the stump was the favorite one. Among those who have operated by this method on an extensive scale may be mentioned Keith, Bantock, Péan, Hegar, and in this country Price. The mortality rate has been low, and yet by nearly all its leading advocates the method has now been abandoned. Fritsch stated the experience of most of us when he reported in 1891 to the Berlin Society of Obstetrics and Gynecology that many of his so-called cured patients returned later with small fistulæ which were, if anything, worse than the former tumors. If this secondary difficulty and a tiresome convalescence can be avoided by exceptional skill and good fortune, there is no reason why the plan should fall from favor. It is easy; it is attended at the time with little shock, and with rigid asepsis recovery is to be expected.

And yet to those of us who regard complete recovery by the extra-peritoneal method as due more to Divine blessing than to the skill or foresight of the surgeon, the paper read before this Society by Prof. Polk, in 1892, giving a plan of procedure for the complete extirpation that could be followed by ordinary mortals was nearly the most welcome contribution that has been made to gynecology during the last ten years. In referring especially to Polk's paper it is, of course, not necessary to remind members of this Society of the notable contributions to the same subject that were made at an earlier period, and contemporaneously by Eastman and Krug; but it may be claimed, I think, without being invidious, that it was Polk's paper which made the operation easy for those of us whose thoughts had not been equally engaged in studying the technical details of the operation.

It was with special delight we greeted the dawn of the new day when we could live at peace together freed from the contention as to the proper treatment of the stump. But the end has not come yet. A little more experience has forced us all to admit that complete hysterectomy is a more severe and more mutilating operation than supravaginal amputation. It may be surgically more correct to remove every vestige of uterine tissue. Still if, thanks to Goffe, to Dudley, to Baldy, to Baer, and to Byford, honored members of this Society; if to Zweifel, to Treub, to Chrobak, to Brennecke, and to Doyen, each in his own way, by closing the peritoneum from above, can leave the vaginal stump without detriment to the patient, considerations of her welfare must in the future make the retro-peritoneal treatment of the stump the method of election. Reports as to the late history of patients thus treated are awaited by us all at this meeting with the greatest interest.

CLINICAL REPORT OF TWO CASES OF RAYNAUD'S DISEASE.[1]

By Frederick P. Henry, M.D.,
of Philadelphia.

Case I.[2]—Patrick M., aged fifty-five years, native of Ireland, laborer, was admitted to the Philadelphia Hospital, November 11, 1893.

Family history. The patient's father died at sixty-five, of asthma, and mother at seventy-five, of "old age." Two brothers have died—one at thirty-five, of unknown cause, and the other at twenty-two, of smallpox. Three sisters died in childhood, of measles and smallpox. Two brothers still living and healthy. He knows of no hereditary disease in his family.

Previous history. He had smallpox and measles in infancy, malarial fever at eight years of age, doubtful left-sided pleurisy twelve years ago. Has used alcoholic liquors in moderate amount, averaging from two to three glasses of beer daily, but would occasionally drink to excess. On the other hand, months would sometimes pass without any indulgence in either beer or spirits. The patient has never had any kind of venereal disease. For the past six winters he has been subject to a severe cough, which has regularly caused the loss of a few pounds in weight. During the spring and summer the cough disappeared and the loss of weight was regained. The summer of 1893 was an exception to this rule. In January, 1893, he acquired a "cold," which has been with him ever since. The cough occurs in paroxysms most severe in the morning, and is attended with a yellowish, scanty, and tenacious expectoration. There has been neither hæmoptysis nor night-sweats. In August, 1893, the patient noticed that his urine was of a deep-red color during the forenoon. This bloody appearance of the urinary secretion was present almost continuously for about one month, but varied somewhat in intensity. One morning in October, 1893, after the patient had been much exposed to cold, he noticed that the helix of both ears was of a deep-blue color. This discoloration continued about two hours, during which the ears felt cold and were painful. Since the last-mentioned date these attacks of local asphyxia have recurred on each exposure to cold. At first the signs of circulatory disturbance were more marked in the right ear, but later the left ear became the more involved, and about December 15th a small portion of the border of its helix became gradually converted into a dry, black sphacelus.

December 25, 1893. The tip of the nose became cyanotic early in the morning on exposure to cold, and has presented the same appearance nearly every morning since. On January 20, 1894, the second and third fingers of the right hand as far as the metacarpo-phalangeal joints became deeply cyanosed on exposure to cold in the morning. This "local asphyxia" has extended to the remaining fingers and to the first phalanx of the thumb of the same hand, but did not at first involve the left hand.

The blood was examined by the resident physician, Dr. Préfontaine, on February 9, 1894. Number of red corpuscles, 2,900,000; hæmo-

[1] Read at the meeting of the Association of American Physicians, Washington, May 29, 1894.

[2] For the notes of this case I am indebted to Dr. Louis Préfontaine, resident physician.

CASE I.—Patrick M., showing cyanosis (local asphyxia) of hands, nose, and ears, and gangrenous patch in left ear.

globin, 43 per cent; white corpuscles not increased in number. No tubercle bacilli could be detected in the sputum.

February 10, 1894. The patient was exposed for a few minutes to the morning air in order to make him more fully illustrative of a clinical leeture on Raynaud's disease which I delivered at the Philadelphia Hospital at 10 o'clock. The experiment was highly successful, the helices of both ears, the tip of the nose, the fingers and pulp of thumb of the right hand, and the three first fingers of the left hand becoming deeply cyanotic and remaining in the same condition for nearly an hour. At 3.30 the same afternoon he passed four ounces of urine of a deep cherry-red or reddish-brown color, which reacted imperfectly to the guaiacum test for blood pigment.

11*th*. Cyanosis of ears and nose.

12*th*. Cyanosis of ears and nose. At 9.30 voided three ounces of reddish-brown urine, which did not respond to Gmelin's bile test, but gave the reaction to Mahomed's test, and contained a few red blood-corpuscles. In the afternoon the urine was of normal appearance, but contained about 7 per cent. of albumin, roughly estimated. Its specific gravity was 1021.

13*th*. Urine still darker than that of yesterday morning, reacting similarly, and containing a very few red corpuscles. It also contained a few short, rather broad hyaline casts stained with pigment. Albumin, 35 per cent. by volume. The afternoon urine was perfectly normal in appearance and gave similar reaction; it was free from casts and contained about 9 per cent. of albumin; specific gravity, 1023. The cyanosis this morning was comparatively slight.

14*th*, 9 A.M. Urine brownish-red, but not so dark as yesterday, acid, no bile reaction, no blood-cells or casts; contains a few large, flat epithelial cells; albumin abundant, apparently 30 per cent. by volume; quantity voided too small for specific gravity test; free from sugar. A specimen sent to Prof. Marshall, of the University of Pennsylvania, at 12 o'clock was of a faint brownish-red hue; much lighter than in the morning; no blood-cells in specimen; did not respond to bile test; free from casts; specific gravity, 1030; reaction acid; albumin, 15 per cent. by volume; free from sugar. 2.30 P.M. Urine amber colored; no sediment; specific gravity, 1027; acid; a trace of albumin; no bile or sugar present; no casts found under the microscope.

15*th*. Cyanosis slight and limited to ears and nose. The urine passed at 7.30 A.M. was of normal appearance, free from sediment, of specific gravity 1020, and contained no albumin, casts, or blood corpuscles. It was acid and free from sugar. 11 A.M. Urine brownish-red, precisely like that passed at 12 o'clock the day before; sediment slight; specific gravity, 1026; acid; contains 15 per cent. by volume of albumin; free from casts, blood-cells, and sugar. A specimen sent to Dr. Marshall. 3.30 P.M. Urine of a cherry-red tint; acid; specific gravity, 1025; distinct ring with Heller's test; no cells or casts. 7.45 P.M. Urine normal in all respects; specific gravity, 1021.

16*th*, 9.30 A.M. Urine of same color as specimen voided yesterday at 11 A.M., and similar in all other respects. 12.30 P.M. Urine darker than at 9.30; acid; specific gravity, 1027; free from blood-cells and casts; contains about 12 per cent. by volume of albumin. 3.40 P.M. Urine entirely normal in appearance; free from albumin, casts, and cells; specific gravity, 1022. This morning the cyanosis was slightly marked on

the nose and ears and absent from the fingers. It persisted, however, longer than usual, being as well marked at 5 P.M. as at any time during the morning. The weather was quite cold. To day Dr. Marshall sent the following report: "The spectroscope fails to show the presence of blood-coloring matter in Patrick M.'s urine."

17*th*, 7.30 A.M. Urine normal. 10 A.M. Urine of light-brownish tint; acid; specific gravity, 1022; no reaction with Mahomed's test; no casts; trace of albumin. Cyanosis is very slight to-day, affecting mostly the left ear, point of nose, and right ear, and absent from the hands. 4 P.M. Urine normal in all respects.

18*th*. Urine shows no change to day; cyanosis slightly less than yesterday and in same areas.

19*th*. Urine normal in color and free from casts, cells, and albumin, although the cyanosis was more pronounced than yesterday in the ears and nose, and was perceptible in the fingers for a short period in the morning between 8.30 and 8.50. On the patient's rubbing his hands briskly it disappeared.

21*st*. The patient was allowed to go out on a pass for forty-eight hours. On his return he reported that on the morning of the 22d, which was very cold, his toes up to the metatarso-phalangeal joints were deeply cyanotic, as well as his nose and ears. His urine also was red during the two mornings of his absence from the hospital.

24*th*. A cold morning, but the patient keeps himself warm near the heater, so that the cyanosis is but moderate and limited to the nose and ears. The urine is normal in color, acid, of specific gravity 1023, and contains neither albumin, casts, nor blood-cells.

The urine was examined almost daily up to March 16th, when the patient left the hospital. It is unnecessary to give the details of these examinations, since they are precisely similar to those above recorded. The cyanosis was of daily recurrence, but varied greatly in severity and extent; on the other hand, the albuminuria was markedly intermittent, being invariably present when the urine was of a deep brownish red hue, and greatly diminished or absent when it approached or reached the normal color. The contradictory results of the examination of the urine for blood-coloring matter are inexplicable. The gross appearances of the secretion during the paroxysms of "local asphyxia" were precisely those of hæmaturia or hæmoglobinuria, and yet no absorption bands were perceived on spectroscopic examination. On the other hand, on several occasions the reaction of blood was obtained with the guaiacum test. As is well known, the late Dr. Mahomed, of London, claimed that this test would show the presence of hæmoglobin when the spectroscope failed to detect it. He stated, however, that it was not applicable to urine which responded to the ordinary tests for albumin. In the case of Patrick M. the spectroscope failed to detect blood-coloring matter, and yet in the same specimen, which was highly albuminous, the guaiacum reaction for blood was distinct. On February 23d I took a specimen of the urine to Prof. Henry Leffmann, who kindly examined it and sent me the following report:

"I made several experiments to-day with that sample, and got the guaiacum reaction for blood-coloring matter very plainly. I rendered the liquid acid by acetic acid, which, of course, caused much effervescence and produced a flocculent precipitate. This precipitate gave the

blood reaction very strongly. I found that neither reagent alone nor when mixed, without adding some of the sample, gave any color."

Dr. Leffmann's examination of the urine with the spectroscope gave negative results.

A specimen was also examined by Dr. Cattell, assistant pathologist to the Philadelphia Hospital, who reported that it reacted in thirty seconds to Almen's test for blood-coloring matter.

When I went on duty at the Philadelphia Hospital on February 1st I found Patrick M. in a ward assigned to phthisical patients. It has already been mentioned that tubercle bacilli were not found in his sputum. I examined his chest with the utmost care, and found neither dulness on percussion nor any auscultatory sign of consolidation or cavity. Sonorous râles were audible all over the chest, and were more marked during expiration, which was prolonged. The thoracic expansion amounted to only one inch and a half, the chest measuring at the height of a forced inspiration thirty-six inches, and at the end of a forced expiration thirty-four and one-half inches. There was a distinct history of attacks of paroxysmal dyspnœa for several years past, and taking this into consideration with the physical signs just mentioned, I concluded that the condition of the lung was one of moderate emphysema, dependent upon asthma and associated with chronic bronchitis. This history of previous asthmatic attacks which, I repeat, is confirmed by existing signs of emphysema, is extremely interesting, inasmuch as it demonstrates a tendency to spasm of unstriated muscle in other tissues besides the arterial.

The heart, it should be stated, showed no signs of disease.

On March 16th the patient left the hospital and gave a false address, so that my efforts to keep him under observation were thwarted. A few days before he left, the necrosed portion of tissue dropped from his ear, leaving a clean-cut semilunar loss of substance in the helix.

On April 13th, he came to my office and reported that he had been very poorly since leaving the hospital, especially during the recent cold and damp weather. The left ear was of a dark-purple color, but contained no gangrenous patches. The nose, right ear, and hands were of normal appearance. I examined his blood with the following result:

Number of red corpuscles per cubic millimetre, 3,166,666; hæmoglobin, 60 per cent; white corpuscles not increased in number. The patient passed about two ounces of turbid, deep reddish-yellow urine, which was acid, of specific gravity 1030, and contained a trace of albumin (Heller's test). It was free from sugar. This sample was examined for blood-coloring matter by Dr. Leffmann, but with negative results.

Case II.[1]—Elizabeth R., aged seventy-seven years, born in Maryland, a widow, formerly occupied with indoor and outdoor farm work. Her mother died at fifty years of age of some acute disease characterized by flooding and vomiting. Two sisters died from the results of miscarriages; two brothers died of pleurisy, and two children of pulmonary phthisis. She had excellent health in early life. Since the age of twenty has had chronic rheumatism, recurring every winter in the right shoulder and arm. There are nodosities in certain of the phalangeal joints. She has had frequent attacks of gastro-intestinal disturbance which she terms

[1] From notes taken by Dr. Lucas, resident physician.

cholera morbus. No history of malaria or syphilis can be elicited. She has never been addicted to the use of alcoholic liquors. At the time of the menopause she had a severe uterine hemorrhage, and has since, at long intervals, been troubled with metrorrhagia. The patient has been troubled with local symmetrical disturbances of circulation for the past twelve winters. For a longer time than this, however, the end of her nose has been rough during the winter months and discolored (purplish) when cold.

In the winter of 1881–82, while exposed to a cold wind, the helices of both ears became painful, and when she reached home it was noticed that they were swollen and black. This painful and discolored condition of the ears has recurred each winter. For the past two winters there have been symmetrical areas of cyanosis upon the cheeks, which, upon exposure to cold, become very blue and painful. In December, 1893, after an attack of influenza, the signs of local asphyxia reappeared in the old areas of invasion, and similar disturbances of circulation manifested themselves on the backs of the hands, the wrists, and the lower forearms. At the same time large elongated bullæ appeared on the inner side of each foot, running parallel with the first metatarsal bone and extending the greater portion of its length, and one on the outer malleolus of the left foot. It was on account of the last-mentioned lesion that this patient was admitted to one of the surgical wards under the care of Dr. John B. Deaver. One of the resident physicians who had seen Patrick M. (Case I.), and who knew of my interest in the subject of Raynaud's disease, informed me that, in his opinion, there was a case of the affection in one of Dr. Deaver's wards. I found his diagnosis correct, and on applying to Dr. Deaver the case was transferred to me. I take great pleasure in expressing my thanks for the opportunity of studying this case to Dr. Deaver, and to his assistant, Dr. Kleinstuber.

Condition on admission to medical ward, March 2, 1894. The patient's general complexion is decidedly pale. The skin of the end of the nose, including an area about the size of a nickel, is thickened, indurated, and verrucous, and surrounded by a cyanotic border. On both cheeks are several large copper-colored spots arranged with almost absolute symmetry, and well represented in the sketch which I pass around for inspection. Precisely similar spots are to be seen on the dorsum of the hands, the wrists, and the forearms. The helix of each ear is swollen, blue, and tender, and contains a small black area of necrosed tissue. Upon the inner side of each foot there is an elongated red spot which indicates the former situation of the bullæ above mentioned. On the outer malleolus of the left ankle there is a cyanotic area, in the centre of which is a shallow, granulating ulcer about the size of a half-dollar. The discolored areas above mentioned are all increased in size and deepened in color in the early morning when the temperature of the ward is comparatively low. The urine has shown nothing abnormal, although repeatedly examined for albumin, sugar, casts, and blood. The patient, however, claims to have passed urine at times resembling milk, at other times as dark as coffee. Careful physical examination has revealed nothing abnormal with lungs, heart, liver, or other internal organ. An examination of the blood showed the number of red corpuscles to be normal, and their percentage of hæmoglobin to be 75. They presented no noticeable alterations of size or shape. The white cells were not increased in number.

May 17. During the last month fresh gangrenous spots have developed in the ears (there are now three in each) and there are complaints of pain when the temperature falls but a few degrees. Both ears are more cyanotic than formerly. In other respects the patient's condition is unchanged.

These cases are typical examples of the affection described by Maurice Raynaud in 1862,[1] and since classified under the head of Raynaud's disease. When clinically complete, the affection is characterized by great pallor and coldness of peripheral parts, such as the fingers, toes, nose, and ears, on exposure to cold, followed by intense venous congestion of the same parts, and eventually, if the circulatory disturbances continue, by well-defined areas of dry gangrene. These are the essential clinical features of the disease, but, in addition, hæmoglobinuria, as in Case I., and scleroderma, as in Case II., have been observed in a few cases. Raynaud's thesis contains a report of twenty-five cases, of which twenty were of the female sex. The disease is most prevalent in early life, the great majority of Raynaud's cases occurring between the ages of eighteen and thirty. The same observer noted five cases of the disease in children between three and nine years of age. He, therefore, suggested the term "juvenile gangrene" as an appropriate one for the affection, but it is objectionable because it might be supposed to imply that the disease is limited to the young. Both of the cases I report are of individuals decidedly advanced in life.

A perusal of Raynaud's thesis makes it evident that he regarded gangrene as an essential feature of the disease, at least in its full development. The first chapter of his treatise, which contains forty-four pages and occupies more than one-fourth of the whole work, is devoted to what he terms spontaneous gangrene.[2] Nevertheless, among the twenty-five cases which it contains there are several in which the process did not eventuate in gangrene, but stopped at the stage of "local syncope," or "local asphyxia." It is evident, therefore, that the minor grades of the disease, the *petit mal*, so to speak, of this arterial spasm, to which renewed attention has been recently called by S. Solis-Cohen,[3] were thoroughly recognized by Raynaud. This is shown, besides, more explicitly in the introductory remarks of his thesis, in which occurs the following:

"My ambition would be rather to demonstrate that certain facts of gangrene of the extremities which one meets at long intervals in practice, and of which the strange appearance is apt to disconcert the most skilful, are in reality much less singular than one would be tempted to believe, and can be connected by intermediate steps with other facts

[1] De l'Asphyxie locale et de la Gangrène symmétrique des Extrémités. Paris, 1862.
[2] It is headed "Quelques Considérations sur la Gangrène spontanée."
[3] "Vasomotor Ataxia," AMER. JOURN. OF THE MEDICAL SCIENCES, February, 1894.

much more common, and which only escape attention by their every-day occurrence."[1]

The chief theories of the cause of Raynaud's disease are: (1) that it is due to an endarteritis obliterans; (2) that it is due to peripheral neuritis; (3) that it is the result of vascular spasm. The last is the theory of Raynaud himself.

The early age of many of the patients, the intermittent character of the symptoms, and the great rarity of the disease as compared with endarteritis, suffice to exclude the latter as a causative factor in its production. There can, I think, be no doubt that cases of symmetrical gangrene occasionally reported as examples of Raynaud's disease have an anatomical basis in endarteritis obliterans, but they are in my opinion spurious. A case of the kind referred to is reported by George W. Jacoby,[2] of New York, and is highly interesting from several points of view. The patient, a male, aged forty-two years, first applied for treatment on account of numbness and coldness of the fingers (local syncope). This was followed by local asphyxia of the same parts, and subsequently by gangrene, the entire third phalanx of the left medius eventually sloughing away. Later, the signs of interstitial nephritis (albuminuria, urine of low specific gravity, casts, hyaline and granular, and hypertrophy of the left ventricle) appeared, and about four years after he was first attacked the patient died in an apoplectic seizure. In this interesting case it is probable, as Jacoby states, that the primary lesion was an arterio-capillary fibrosis, which gradually invaded the vascular system, attacking the vessels of the kidney later than those of the hands.

Jacoby gives the notes of another case in which the asphyxia was limited to the hands, and in which a cure was effected by a prolonged course of anti-syphilitic treatment. The cause of the condition was, presumably, a syphilitic arteritis.

There is little to support the theory that peripheral neuritis is the cause of Raynaud's disease. In the first place, the rarity of the latter and the frequency of the former militate strongly against it. Secondly, the cases in which neuritis has been found post-mortem may be examples of mere coincidence, or, more probably, the neuritis was secondary to the local circulatory disturbance. A degree of asphyxia sufficient in its severe forms to produce gangrene might, in its lighter grades, readily lead to degenerative and inflammatory changes in the nerves of the affected part.

The theory of arteriole spasm is certainly the one that is most in accordance with the clinical phenomena. The disease is most prevalent in females and in the young—*i. e.*, in those whose vasomotor system is most impressible. It occurs in paroxysms which are caused by the

[1] Barlow's translation of Raynaud's Thesis. New Sydenham Soc., 1888, vol. cxxi.
[2] New York Medical Journal, Feb. 7, 1891.

surest exciter of vascular spasm—cold. Finally, in several cases during the paroxysm there has been dimness of vision, which was shown by the ophthalmoscope to depend upon a contraction of the central artery of the retina and its branches, and in one recently reported by H. M. Thomas[1] the attacks of local syncope were followed by a chill, loss of consciousness, and convulsions. Such facts are in the highest degree corroborative of Raynaud's view, that the disease known by his name is due to an "enormous exaggeration of the excito-motor energy of the gray parts of the spinal cord which control the vasomotor innervation."

The symptom, hæmoglobinuria, occasionally observed is best explained by the theory of vascular spasm. The origin of the hæmoglobinuria may be twofold: it may be due to excretion of hæmoglobin that has been separated from the red corpuscles in the peripheral asphyxiated parts—nose, ears, and fingers—or it may be due to an asphyxia of the renal or other internal vessels. I incline to the latter view as most applicable to Case I., and for the reason that the hæmoglobinuria was the first symptom in the case. It will be recalled that the deep-red color of the urine attracted the patient's attention in the *summer* of 1893, about two months before the peripheral asphyxia was observed.

I freely acknowledge, however, that the facts are in favor of the view that in the majority of cases in which hæmoglobinuria is observed this symptom is dependent upon an excretion of hæmoglobin which has been separated from the red corpuscles in the peripheral asphyxiated parts. Hæmoglobinuria coinciding with hæmoglobinæmia of the blood of the asphyxiated fingers has been frequently observed.[2] On the other hand, hæmoglobinæmia may exist, and probably often does, without hæmoglobinuria. An instance of the latter kind is reported by Taylor and Colman.[3] The patient was a girl, ten years of age, who was subject to attacks of dead finger (local syncope) affecting the distal phalangeal joints. "Local asphyxia" was never observed. In blood withdrawn from the finger during an attack the liquor sanguinis was distinctly colored, while the red corpuscles were shrivelled and irregular in shape and many of them devoid of hæmoglobin. Neither hæmoglobinuria nor albuminuria was ever present. I regret that a more thorough examination of the blood taken from the fingers during the stage of asphyxia was not made in the first of my cases. It was examined but upon one occasion and nothing abnormal was detected. It is probable that hæmoglobinæmia is frequently present without hæmoglobinuria. The spleen and liver are capable of storing up large quantities of hæmoglobin; in fact, according to Ponfick, it is not until the separated hæmo-

[1] Johns Hopkins Hospital Reports, vol. ii.

[2] For example, by A. T. Myers: Trans. Clin. Soc. London, 1885. Boas: Deutsch. Archiv für klin. Med., 1883. Bristowe and Copeman: Trans. Med. Soc. London, 1889.

[3] Trans. Clin. Soc. London, 1890.

globin amounts to one-sixtieth of the total amount in the blood that hæmoglobinuria occurs. Until the hæmoglobinæmia has reached this degree, the attack, so far as the urine is concerned, is only manifested by albuminuria. It seems to me probable that paroxysmal albuminuria in other affections than Raynaud's disease may be but a symptom of a comparatively mild grade of hæmoglobinæmia.

The relation between Raynaud's disease and chilblains has been recently studied by Legroux,[1] and is worthy of further investigation. As this writer tersely remarks, chilblains do not come at will,[2] a predisposition is essential to their production, and he raises the question whether chilblains, local asphyxia, and symmetrical gangrene may not represent different degrees of a necropathic dystrophy, of which the most striking example is furnished by syringomyelia.

To those who have seen at least a single instance of Weir Mitchell's disease (erythomelalgia) it seems scarcely credible that it should have been confounded with the affection of Raynaud. Nevertheless, this has been done. I will content myself with stating here that the differences between them are radical.[3]

I have said nothing about the treatment of these cases because no systematic treatment was pursued in either of them. With the exception mentioned in the report of Case I., they were protected from cold and nourished as well as circumstances permitted. It was expected that with the approach of milder weather their condition would improve, and this expectation was fulfilled. It was my intention to test in one of the cases the effect of the electrical bath as recommended by Barlow and R. Glasgow Patteson,[4] and in the other that of the continuous administration of glonoin in small oft-repeated doses.

My report is nothing more than it pretends to be—a clinical one. I have made no attempt to analyze the numerous recorded cases, still less to separate the spurious among them from the genuine. Raynaud's disease is a paroxysmal affection, and, therefore, cases in which peripheral gangrene has followed injury of the part affected or has gradually supervened upon an obliterating endarteritis, as well as those in which the stages of local syncope and local asphyxia have been absent, are, to say the least, to be regarded with suspicion.

[1] Annales de Dermatologie et de Syphiligraphie, 1892, tome iii.

[2] "N'a pas des engelures qui voudra."

[3] For the differential diagnosis between these diseases the reader is referred to Dr. Weir Mitchell's article on "Erythromelalgia," in the Medical News for August 19, 1893.

[4] Dublin Journ. Med. Sci., vol. xciii.

ON THE VALUE OF OPHTHALMOSCOPIC CORNEAL IMAGES.

By Ernest E. Maddox, M.D.,
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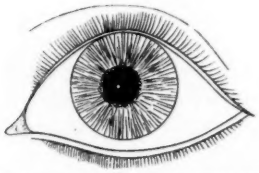
When an eye is illuminated by reflection from an ophthalmoscope, a brilliant spot of light appears to rest on the cornea, produced, in reality, by reflection from its surface as from a strong convex mirror. This is shown in Fig. 1. The beginner in ophthalmoscopy is only too well

Fig. 1.



To show the corneal image in an average eye; the pupil displaced slightly inward, and the corneal image displaced still more inward.

acquainted with this spot, which gets in his way whenever he attempts to explore the fundus. It is well, therefore, to know its powers for good as well as evil, and that in a variety of ways the very same reflection can be turned to good account. A corneal image produced by light reflected from a perforated mirror, such as that of an ophthalmoscope, affords far greater precision in the clinical investigation of the position of an eye than a corneal image formed in any other way, provided attention be given to one or two simple details. The first of these details is to insure that the patient's attention is directed at least to the mirror, and preferably to its central aperture, while the light is flashed on to first one eye and then the other.

Under these conditions, the visual axis of each observed eye coincides in turn with the visual axis of the observer's eye, and the spot of light maps out with very fair precision the point in each cornea which is traversed by the visual axis of that eye.

Under no other conditions does it do so, so that, unless the patient looks at the aperture of the mirror, corneal images produced by the ophthalmoscope possess no advantage over those produced by, for instance, holding a lighted match before the eyes, or making the patient look at the window. Suppose a patient appears to have a slight squint, and we do not know whether it is only apparent or real, the question is at once decided by flashing the light first on to one eye, then on to the other.

If the corneal images occupy symmetrical positions in the two corneæ, as in Fig. 2, no squint exists, and the cause of an apparent squint will at once be evident from the fact that the corneal image in each eye will be found to occupy an unusual position, showing that the visual axis traverses the cornea at an unusual point, thus producing the appearance of a squint. Suppose, again, that a patient complains of total blindness in one eye, without any visible changes to account for it. If we find the corneal images are sufficiently unsymmetrical to prove the existence

FIG. 2.

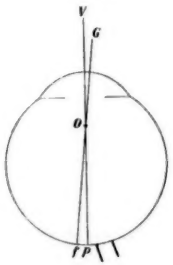
of a slight squint, this would afford strong evidence of the blindness being real. A large squint would be no evidence, but the slighter the squint the greater the evidence, for the more easily would the diplopia be overcome were binocular vision to exist.

In one such case I found the test of great value in furnishing evidence that a monocular blindness was not, as at first suspected, feigned, but real, for patients have no voluntary power for suppressing the desire for fusion. Again, with babies the test is of special service, for though they cannot, of course, fix the central aperture, they cannot help gazing at the bright light from the mirror, which answers almost as well, and then by *rapidly* flashing the light from one eye to the other, it is easy to see, not only whether any deviation exists, but also which is the squinting eye. To be expert, a little practice is necessary, but the same is true of every method of examining the eyes. Many a doctor's perplexity in the endeavor to solve an anxious mother's query about her child's eyes would be at once dispelled if these corneal images came to the rescue. It is a matter for surprise that they have not come into general use long ago.

When the vision of babies is imperfect, or the two eyes do not work well together, it is easy to find whether each eye possesses the power of central fixation by observing whether each corneal image occupies what I have called the "fixation position" with steadiness. This leads me to describe the "fixation position," and mention the second precaution to be observed—namely, to allow for the angle alpha and its variations. The very name of this angle is apt to frighten the unmathematical reader, since it is generally only spoken of in connection with physiological investigations, but it can very easily be turned to the simplest clinical uses, without carrying the reader into needless refinements. We will, for simplicity, suppose that the eye has only two axes, as in Fig. 3, viz., the geometrical axis and the axis of vision, and explain these briefly:

The geometrical axis (G) is the axis on which, so to speak, the eye is built, passing from the centre of the cornea in front to the posterior pole of the eye behind, and passing, on its way, through the centres of the various media. With this axis, however, the axis of vision (V) does not coincide, for, curiously enough, we do not see straight out of our eyes, but obliquely out of them.

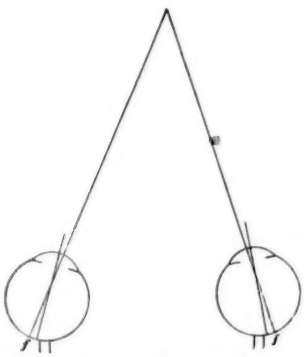
FIG. 3.



This is due to the fact that the "fovea centralis" (*f*) does not lie exactly at the posterior pole of the eye (*p*), but slightly to its outer side and below it.

Consequently, the axis of vision intersects the geometrical axis at the optical centre (*o*) of the eye, as shown in Fig. 3, where for simplicity

FIG. 4.



To illustrate how each visual axis traverses the cornea to the inner side of its centre; drawn to scale one-half life size.

the two nodal points are reduced to one, and then traverses the cornea to the inner side of its centre. In consequence of this, the corneal image,

visible while the patient looks at the centre of the ophthalmoscopic mirror, and which, as we have already said, maps out on the cornea the point of its transit by the visual axis, appears to the inner side of the centre of each cornea. (See Fig. 4.) The average angle between the two axes is, in emmetropia, 5°. In hypermetropia the angle is greater, the average given by Donders being nearly 8°, and in myopia it is less, sometimes even negative, the average given by Donders being less than 2°.

In consequence of these differences, hypermetropic eyes appear slightly divergent, and myopic eyes slightly convergent, and hence arise the two well-known varieties of "apparent squint." The apparent position of the corneal image on the cornea, while the centre of the mirror is fixed by the patient, might, as already mentioned, with advantage be called the "fixation position" of the image. We have seen that in emmetropia the fixation position is to the inner side of the corneal centre; in hypermetropia it is still further to the inner side, because the angle alpha is greater; in myopia it is less to the inner side, or even, in some cases, slightly to the outer side of the corneal centre, because the angle alpha is smaller, or even negative. In emmetropia the most common condition is, as represented in Figs. 1 and 2, for the pupil to be slightly to the inner side of the centre of the cornea, and for the corneal image to be again slightly to the inner side of the centre of the pupil. It is important, however, to note any anomaly in the position of the pupil, lest it should mislead, and if the pupil be misplaced, the position of the image in the cornea should be studied rather than its position in the pupil. In an eye free from nystagmus, and which possesses the power of central fixation, the corneal image occupies the fixation position with great steadiness. If central fixation, however, be lost, the image is seen to wander aimlessly about the cornea, though really, of course, it is the cornea itself which wanders.

Mr. Priestley Smith has made a very interesting observation that in tobacco amblyopia the power of central fixation is retained, while in some cases of retro-bulbar neuritis it is lost. An absolute scotoma involving the macula would, of course, destroy it, and it might very likely be abrogated by functional or organic changes at the macula, produced by looking at strong light, or by constant use of the microscope, etc. With a little practice, it is quite easy to surmise from the corneal image alone whether an eye is much hypermetropic or myopic, and I have pointed out elsewhere that a high angle alpha, as indicated by an unusually incentric corneal image, should, in an apparently emmetropic eye, make us suspect the presence of latent hypermetropia and induce us to paralyze the accommodation. It may, perhaps, be well to explain that, since the cornea acts as a strong convex mirror, any image which is formed by reflection from its surface is, of course, a virtual image, the

distance[1] of which behind the cornea depends on the distance of the flame, and the position and shape of the mirror, but in practice the depth of the image need not concern us, and we may regard the cornea, the pupil, and the image as all in one plane.

The nodal points of the eye do not always lie in the geometrical axis, and this would, of course, affect the angle alpha, but clinically this consideration also can be waived. The existence of the angle alpha was first proved by Senff, Helmholtz, and Knapp, and its increase of magnitude in hypermetropia and decrease in myopia were subsequently demonstrated by Donders.

Its character in astigmatism does not appear to have been studied fully yet. In some cases of hypermetropic astigmatism in which the deficient curvature was horizontal, I noticed a greater angle alpha than in emmetropia.

For exact measurements Helmholtz's ophthalmometer would be necessary, but that transports us out of the clinical field into the physiological. The beauty of ophthalmoscopic corneal images is that we are able, as it were, to actually *see* in a moment what point of the cornea is traversed by the axis of vision (see Fig. 4 again), and by the distance at which this point lies from the centre of the cornea to guess approximately the amount of the angle alpha. Any instance of an unusually high or low angle at once strikes us, and should set us to try and account for it by looking for some abnormal condition of refraction, excentric fixation, or unusual shape of the eye.

The clinical recognition of the angle alpha is, I believe, the key to the successful use of ophthalmoscopic corneal images, and it is this which

FIG. 5.

To show the asymmetry of the images when the eyes look away from the mirror, though the eyes are not squinting - illustrating how *not* to use corneal images.

makes me enforce the necessity of the patient's attention being directed to the mirror, and, if possible, to its central aperture, since, then, in normal eyes two images are equally displaced inward, and, therefore, symmetrical (Fig. 2). If the *same* eyes be allowed to wander to one or other side, the images will, of course, appear unsymmetrical, for one will be nearer the edge of its cornea than the other, by a distance equal to the combined original inward displacement of each. (Fig. 5.) The

[1] The cornea is a mirror whose "principal focus" lies 4 mm. behind its anterior surface, and, therefore, about the plane of the pupil.

vertical element of the angle alpha, shown by the corneal image lying slightly above the horizontal diameter of the cornea, seems of less clinical importance, and it is often imperceptible, though its amount is also subject to variation; I have not devoted much attention to it.

It is very pretty to see how faithfully the corneal image occupies its correct "fixation position" in cases of lamellar cataract not quite large enough to fill the pupil, even though the image appears to lie opposite the most opaque portion of the cataract. The visual axis, therefore, traverses the cataract, as, of course, it should do, on simple optical principles. Similarly, in cases of very peripheral iridectomy for occluded pupil, and when the iris is drawn to one side as in old cases of prolapse, the corneal image still occupies its proper position, though against an opaque background, and demonstrates, perhaps more prettily than anything else could do, the fallacy of supposing that a peripheral iridectomy predisposes to strabismus, or alters the relations between convergence and accommodation.

Now let us consider a difficulty in the detection of strabismus by corneal images which arises very occasionally. The angle alpha may be different in the two eyes, so that the corneal images appear unsymmetrical. The asymmetry in these cases is, however, so slight that its very smallness leads us to suspect its true cause, and if we place the hand over each eye in turn, it will be found that the "fixation position" is not the same in each. A "monolateral" squint is one in which the same eye always fixes and the other always squints, in contrast to an "alternating squint" in which either eye fixes indifferently. In squints of high degree it is most easy to determine whether they are alternating or monolateral, without the aid of corneal reflections, by simply covering the fixing eye for a few moments, so as to make the other one take up fixation instead; if the latter continues to fix when uncovered, the squint is alternating, but if fixation is at once transferred back to the originally fixing eye, the squint is "monolateral!" With minute squints, however, it is not so easy to settle this point without the aid of corneal images which enable us at once to see which is the fixing eye, and whether by covering this eye temporarily fixation can be transferred to the other. A still more important point to settle is that of "concomitancy," because by this alone can we tell whether or not a squint is *paralytic*. In paralytic squint the degree of strabismus increases on looking in the direction of action of paralyzed muscle, whereas in concomitant squint the degree remains the same in whatever direction the patient looks. The following method is one which I can thoroughly recommend: Lay the palm of the left hand on the patient's head, with instructions to let the head follow the most gentle guidance of the hand without resistance. Now note the exact position of the corneal reflex on the squinting eye, while the fixing eye is directed to the central

aperture of the mirror, and steadily turn the head to the right and left, up and down, and into intermediate positions, to notice whether the position of the reflection is unchanged by these manœuvres. If it is unchanged, the squint is concomitant; if otherwise, the squint is paralytic, provided that the movements made are not too great to bring in the fallacy of mechanical impediment from one of the corneæ reaching almost to a canthus. Vertical squints are just as easily detected as horizontal ones. The last use of corneal images which I shall describe in this paper is one which I have sometimes found of value, viz., to test for binocular fixation when its existence is doubtful.

Binocular vision and binocular fixation are often assumed to be identical; but the latter may, at least hypothetically, be supposed to exist without the former, since the seat of binocular vision is in the occipital lobes, and that of binocular fixation in the corpora quadrigemina, or their vicinity. Mr. Berry was kind enough to let me try my test on a case, which I think was one of binocular fixation without binocular vision—a patient of his with congenital paralysis of the left external rectus. The left eye could not be moved beyond the middle line; loss of abduction, in other words, was complete. No diplopia could by any means be elicited, and yet on looking to the right both eyes seemed to move in perfect unison. Corneal images showed that on looking to the right each eye was accurately fixed for the mirror, until suddenly the middle line was reached, when the squint appeared. After operating for strabismus, and setting a squinting eye apparently perfectly straight, we are often at a loss to be sure whether both eyes are able to work together. We have some interest in finding this out, because if they do we know it will be a great preservative from any return of the strabismus, and we can give a better prognosis accordingly. By subjective tests it is often impossible to settle the question, the patients being so frequently either too young or too unintelligent to give us any assistance. An objective test, even though difficult, is, therefore, a great help, and I may repeat the description which I have given elsewhere:

"After operation, for some weeks at least, the eye operated on tends to remain more stationary than its fellow, so that by turning the head slowly to the right or left, we make, if binocular vision is absent, the corneal image on the squinting (and operated) eye slowly and steadily move across part of the cornea. If binocular vision be present, it *may* be strong enough to overcome the sluggishness of the squinting eye, in which case its image remains in the "fixation position" throughout. But even if the desire for single vision is not strong enough to effect this, there is always, if it be present at all, a part of the field of fixation over which the "fixation position" is maintained, and at the edge of this region the corneal image *suddenly* moves to another point. It is the continued maintenance of the fixation position during lateral move-

ments of the head, or else the sudden abandonment of the fixation position, instead of only gradually moving away from it, on which I count in making the test."

It is right to say that the use of Mr. Priestley Smith's excellent "tape method" of measuring squint at a metre was what first led me to make a study of corneal images at closer quarters and binocularly—as my first paper on the subject[1] elicited he had been simultaneously doing.[2]

A paper by Gullstrand (Sweden) must, by its review[3] later on, be a good one, but I have not yet had access to it. He prefers a laryngoscopic mirror, so as to illuminate both eyes at once, and I find it does so very prettily, though it has to be held at rather too great a distance, and in practice, of course, ophthalmic surgeons would always prefer to use the instrument in their hand—the ophthalmoscope. A dark room is not necessary, as the method is, if anything, rather easier in a light room. The chief difficulty with a beginner is to avoid being misled by the irregularities which prevail in the size and position of the pupil. Asymmetry of the pupil is immensely more common than asymmetry of the corneal images. Frequent practice, however, soon dispels the difficulty, and since a few seconds suffice to make the observation, practice is worth cultivating on nearly every patient who is seated for examination of the fundus.

GONORRHŒAL ARTHRITIS; WITH NOTES OF CASES.

By Thomas H. Manley, M.D.,
of New York.

The complications of gonorrhœa are sometimes very painful and serious. Its sequelæ are numerous, often undermine health, or give rise to very grave symptoms. The most lamentable and unfortunate feature about this venereal malady is that the contaminated may infect the innocent; and that its virulence may, with all its intensity, fall on the latter, imperilling life or inducing organic disease, while the former is but slightly disturbed by it. Another strange and inexplicable character belonging to it, is its diverse and protean manifestations. Probably there are more lives lost from it, directly and indirectly, than are recorded. The physician, from a sense of respect for the family, or other equally worthy motives, is loath to set forth in the mortuary-certificate the real cause, and, by an evasion, substitutes something else. For

[1] Edin. Med. Journal, January, 1892.
[2] Ophth. Review, February, 1892.
[3] Ophth. Review, December, 1892.

similar motives, in the majority of cases, he is obliged to often conceal the real nature of the malady from members of the family or friends of the patient while in charge of a case which has complications or is followed by serious sequelæ.

My impression is that the profession, as a whole, is not yet fully alive to a full knowledge of all the serious disturbances to which this disease may give rise. I am assured that this certainly is the case in many instances in which the disease spends its virulence on the arthritic structures, where mon-articular rheumatism is associated with or succeeds it. For the purpose of illustrating, to a certain extent, the rather common occurrences of an infectious arthritis as a sequence of gonorrhœa, and emphasizing the importance of its early recognition and active treatment by appropriate measures, this brochure is submitted.

One of the most unfortunate features in connection with cases of gonorrhœal arthritis is that the medical attendant is often obliged to conceal the truth when he has them in charge, at least as far the family are concerned, the near relatives or friends. To tell a woman who is suffering the harrowing agony of an acute arthritis that her husband is the author of all her misery, and that he gave her the disease, would, in many cases, lead to the sudden breaking-up of that household and perhaps bring great misery to an innocent family of little ones. One, indeed, must exercise the shrewdest discretion here, further, for the reason that authorities are not yet by any means unanimous in their views on the etiology of the malady, some going so far as to affirm that it may develop subsequent to any irritation of the urethra, in the chaste as well as the infected.

The malady has been designated by me "gonorrhœal arthritis," because, as far as my individual experience goes, it is always associated with, or a sequel of, gonorrhœa. The affix rheumatism has been discarded, inasmuch as it bears but little resemblance to this malady, either in respect to causation, pathological changes, clinical history, or therapeutical requirements.

Etiology.—In 1878 Neisser discovered and described the gonococcus. He was able to cultivate it, but failed in his inoculation-experiments. From it being so constantly found in suppurative arthritis, he assumed that it was the infecting germ of clap. But many modern and experienced bacteriologists fail to agree on this point, several maintaining that the morphological character of the germ found in gonorrhœa vary, and that the so-called gonococcus may be found at times in the healthy, non-polluted urethra; besides, they affirm that they are not always present in gonorrhœa. Prudden and Delafield[1] admit that the rôle of the gonococcus is yet an unsettled question, and that it will require

[1] Histology and Pathological Anatomy, p. 312.

further observations to definitely establish its position. Billroth, Paget, Greene, and others take a similar view.

Therefore, as the precise fundamental element on which the contagion of gonorrhœa depends remains yet in doubt, we are unable to explain, on a scientific basis, the relation of this malady with the joint affection so often witnessed during its course.

All are agreed that gonorrhœal arthritis is always dependent on a urethral irritation or inflammation; in other words, on gonorrhœa, or a morbid state of the urethra closely resembling it. But authorities are at variance on the vital question of the infectious quality of the urethral discharge, or its dependence on a toxic contagion. Can a gonorrhœal arthritis be excited by injecting into the joint the purulent secretion of an acute clap, or *vice versa?* Can a suppurative arthritis be developed by charging the healthy urethra with the fluid contents of a gonorrhœal arthritis?

Stangiale[1] made the following observations in a case of gonorrhœal arthritis: Cultures made from the exudation thrown from the joint, with all precautions as to asepticity of instruments, showed no sign of growth. The effusion was purely sero-fibrinous and not at all puriform. The ordinary agents, like the culture media, failed to show any bacterial elements either in it or the blood withdrawn from the neighborhood of the infected joint. Further inoculations with the exudation also gave negative results, both in animals and in the human subject. The latter fact was ascertained by introducing some of the exudation into the deep urethra, and allowing it to remain there several hours. The report states that no inconvenience whatever resulted. Stangiale therefore agrees with the majority of observers in asserting the absence of specific toxines from the effusion of gonorrhœal rheumatism.

Hogge[2] divides the bacteria of gonorrhœa into gonococcus and pseudo-gonococcus, alleging that it is only in certain states and in certain types of gonorrhœa that the specific germ can be isolated. Gourley[3] scarcely mentions gonorrhœa as a cause of joint disease.

It cannot be said that a study of micro-organisms has thrown any light on the connection between an arthritis and a mon-arthritis.

Gonorrhœal rheumatism so-called for the first time by Swiedeur, who was the first to give it an exhaustive study, though Brodie, Astley Cooper, Bonnet, Foucart, Brandes, and Rollet are each worthy of mention as early investigators. But it is only lately that it has been allowed to hold sway in the nosological system, as there have been many who have attempted to explain it away on various hypothesis. Bumstead[4] cites Astley Cooper as being among the first in England to recognize and describe this as an independent disease. Bumstead claimed that sexual

[1] Gazz. degli Osp., Feb. 11, 1893.
[2] Annals of the Genito-urinary Organs.
[3] Diseases of the Genito-urinary Organs, 1892.
[4] Venereal Diseases, p. 217.

influence is important, and that the malady exists, if at all, in females. Foucart never saw a case in a female. Brandes, of the Venereal Hospital of Copenhagen, had a similar experience. But, Rayer and Bonnet[1] both report cases in females.

Brodhurst[2] says that the disease usually described under the name of gonorrhœal rheumatism is plain from the course of symptoms and effects of remedies; that it differs from ordinary rheumatism in many essential circumstances, though it seems no doubt, that while it occurs in most circumstances as a consequence of gonorrhœa, it may take place independent of gonorrhœal infection.

Mansell Moullin[3] says, that "urethral arthritis" is closely akin to puerperal arthritis, though dependent on some lesion of the genito-urinary mucous membrane. It is most common after gonorrhœa, though the proportion of cases in which it occurs is exceedingly small. In some cases it appears to be pyæmic, due to septic absorption from ulceration of the urethra, ending in acute ulceration and destruction of the joint; but that in the majority of cases there is little tendency to the formation of pus. This author advances the idea that it may possibly be due to reflex irritation of the nervous system.

The author of "Gonorrhœa and its Complications," in the *System of Surgery by American Authors*, says, on causation: "This disease has been ascribed to various causes, as metastasis, reflex agency, identity of syphilis and gonorrhœa, pre existing rheumatic diathesis, and finally a form of septicæmic infection, the last being the one usually accepted as correct."

Billroth[4] places this among the metastatic inflammations. He says that it usually occurs during an attack of gonorrhœa, but that it may follow on the passage of a sound or bougie. Sexual intercourse with a menstruating female has been known to produce it.

In concluding the etiology of the subject it may be well to add that until very recently there have been many high authorities who denied that this affection was anything other than a rheumatism, aggravated or intensified and having peculiar characteristics imparted to it by a venereal infection. They argued that like rheumatism it had an affinity for the fibro-serous tissues, as the cardiac and brain membranes, and was most prone to occur in consequence of cold, dampness and exposure.

But recent and extended investigations have proven that it has little if any affinity to inflammatory rheumatism, either in its clinical features, pathology or indications for treatment. It has been clearly and definitely established that it has a definite connection with urethral irritations or inflammation, specific and non-specific.

Accordingly, then, from all that can be gathered from reliable sources, and from those most competent to give an opinion, though gonorrhœal

[1] Traité des Maladies des Femmes, p 217.
[2] Reynolds' System of Medicine, p. 203.
[3] Surgery, p. 612.
[4] Surgical Pathology.

arthritis is generally present only in association with, or consecutive with a specific clap, yet it may and does occur simply from urethral irritation of a non-venereal character; therefore, it cannot be regarded as a condition always attributable to a specific microbe, and may attack the joints of the pure and untainted as well as the polluted sinner. In all of my own cases except one it supervened on genuine clap of the venereal order, though in other cases with which I am familiar infection was denied. Certainly, in some of them no gonococci could be found on repeated examinations, though in all there was a urethritis.

Clinical History.—The general outlines of gonorrhœal arthritis, while bearing a close analogy to acute rheumatism, are yet quite unlike it in many important particulars. In the former it follows a chill; but its onset is more gradual. It, unlike rheumatism, is not a flitting disease, skipping from one joint to the another and one side of the body to the other. There are not those remissions of pain and fever, those short acute exacerbations. On the contrary, the temperature in gonorrhœal arthritis seldom rises but a degree or two above the normal unless suppurative changes set in. The pain is steady, increasing in intensity until its climax is reached, when its moderation is as gradual and steady as was its advance. The pain is always most intense at night. The patient with this disease, unless it be of a very grave type, is up and about most of the time, seldom taking to bed except at night. Gonorrhœal arthritis runs a tedious course. The orthodox treatment for rheumatism among many skeptics was "six weeks." Six months would be about the right period for a severe attack of gonorrhœal arthritis.

Of course the disease may not extend over that length, but the patient will have little use of the joint for that time, and will do little but hobble about on a crutch or stick, in a severe case, which involves the lower extremity, till at least the six months are past.

This type of arthritis seldom involves more than one joint at a time. It has been said that the knee-joint is the usual seat of this affection and that it may be practically regarded as peculiar to the male sex. Bonnet wrote that its usual site was in those articulations never visited by rheumatism, as the sterno-clavicular and the rhachidian joints.[1] These observations certainly do not coincide with my experience, for I have seen nearly as many cases in women as in men, and many of the worst cases which have come under my care were in the upper extremity.

Perhaps this discord in observation may be accounted for on the ground that the most extensive observers have seen but few typical cases, and that they imprudently generalized on too small a number of cases.

But it appears, however, to be the general consensus of opinion that

[1] Bonnet: Maladies des Ven., p. 217.

it is quite common for more than one joint to be affected, as we see from Foucart and Brandes' tables:

In 81 cases the disease was in the—

Articulation of the	knee,	64
" "	ankle,	30
" "	hip	15
" "	fingers and toes	15
" "	shoulder,	10
" "	wrist,	10
" "	elbow,	8
" "	sternum and clavicle	3
" "	tarsal bones	2
" "	sacrum and ilium	1
" "	lower jaw.	1
" "	tibia and fibula	2

Gonorrhœal inflammation falls with great energy on the thecal envelops and bursa.

Fourner collected 120 cases—38 his own. The whole number of joints affected was 212. The knee 83 times (over two-thirds); the ankle 32 times (about one-quarter); fingers and toes 25 times (about one-fifth.

Gonorrhœal arthritis is always a severe disease; but I cannot find in its literature that it has a mortatity. Neither can I discover chronicled any cases in which amputation has been rendered imperative to save life, as in one of my own cases.

It must be assumed that in those grave cases in which the endocardium participated in the pathological changes many lives must have been lost. Of course, we can understand that the mortuary records outside of a hospital are of no value in throwing any light on this side of the question; but certain it is that any malady which entails so much protracted suffering and waste of bodily strength cannot be regarded as free from danger, probably through visceral complications or blood infection.

Morbid Anatomy and Pathology.—I am unable to discover in the literature of the subject the records of any *post-mortem* examinations in cases of gonorrhœal arthritis. Hence, a detailed description of the morbid anatomy of the parts found after death in the different stages of this malady cannot be provided. We must, rather in this respect, depend on what we see through life in the action of the malady on the joint in the inflammatory, ulcerative or suppurative changes which lead occasionally to limitation of motion, ankylosis, and atrophy. In mild cases it cannot be said there are any tangible changes in the joint apparatus, the bone cartilage, ligament, synovial or tendon structures, while in all those severe grave cases permanent lesions of all these structures are general.

The pathological changes are most characteristic and uniform in all

types. Some pathologists divide this malady into three stages and describe three different types of the malady. Erichsen recognized three forms: first the *serous*; second the *purulent*; third the *fibrinous*.

This later classification in my experience serves no useful purpose, for in the ten cases which have come under my observation it was quite impossible in several to distinguish one type from the other; in fact, there is no doubt but we may meet with cases in which the exudate is of a mixed character. Besides, it is entirely resonable to assume that in no inconsiderable number intense hyperæmia and congestion alone appear as a pathological state, when the disease, either by causes acting through the system, or by an active antiphlogistic therapy, is suddenly cut short and undergoes resolution. These may be designated the *walking cases* of gonorrhœal arthritis, which are as common as they are harmless.

For all practical purposes it is my conviction that it is enough to divide gonorrhœal arthritis into two classes. By this means its pathology can be more readily comprehended, a rational therapy instituted, and a safe prognosis given.

1. Sub-acute, or Abortive.—This type is the most common. There are many who never go quite through all the stages of gonorrhœa, or are exposed to a wetting or a chill, who do not have a twinge of rheumatoid pains in one or more joints, most commonly in the lower extremities. The inflammation in this mild type involves the synovial sheaths and thecal envelopes of the tendons, then the bone or arthritic structures. Its course is short and acute, but it is not attended by any marked thermal disturbance, severe pyrexia being seldom present. In fact there is slight if any constitutional disturbance, and though locomotion is severely painful, the patient "wears it off" and continues at his occupation, unless it is very laborious. Where there is a perceptible exudate into the joints it gradually subsides, and entirely disappears leaving the functions of the limb unimpared.

Very many of those cases are regarded as *rheumatism*. The patient may conceal the existance of clap, very often it is not suspected, and when joint disease is discovered it is generally expedient not to insist on its origin.

2. Acute Severe Gonorrhœal Arthritis.—In this type we will always have well marked pathological changes with more or less organic alteration in the joint elements. Here we will have any degree of pathological changes from a simple serous effusion to such a destructive joint suppuration as may demand the sacrifice of the limb. I have met with three cases of the latter which had been set down as "tubercular arthritis." Since the tubercular craze has recently swept over the profession there are some who can seldom if ever see any description of joint suppuration except tubercular. When the bacillus confirmation

was wanting then it would be said that the staining methods were faulty. But it is very probable there is no inconsiderable number in which the gonorrhœal infection has been engrafted on a tubercular diathesis.

The first stage of gonorrhœal arthritis is not as a rule painful. There is but little intumesence around the joint, and it is only over the tendons and at the insertions of the ligaments that we will elicit pain on pressure. But when the state of effusion has arrived and inflammation extends up through the tendon and muscle sheaths, the limb for a considerable distance above and below the joint is exquisitely tender, and all the tissues are more or less tumefied. As the progress of a gonorrhœal arthritis is slow when once well established, transitional changes are very tedious. In favorable cases resorption of the serous effusion takes place after a given time, and leaves little or no trace of the local action; but, we may have a recrudescence through some indiscretion of the patient, and the disease is rekindled with greater activity than ever. Now, the exudate may undergo fibrinous changes, so that when inflammatory changes have ceased, the articulating surfaces are solidly ankylosed by organized fibrin.

For some reason only explained on theoretical hypotheses, suppuration will set in and we will have symptoms of septic infection. The patient is hectic; is anæmic; emaciated and presents the appearance of one sinking from a wasting disease. In this class we may have one of three things occur. First, we may have resorption of the pus exudate, when this is not abundant and not too virulent; secondly, there may be a spontaneous opening and escape; or thirdly, there may be a maceration of the joint surfaces with ulceration and erosion of cartilage, ligament, membrane and bone. In this latter systemic infection is pronounced, and life is imperilled if the limb is not promptly amputated. Resection is quite out of the question.

In those severe cases the synovial membrane is always greatly thickened, its inner surface granular, pulpy and friable. The erosion of the articulating cartilage and bone gives their surfaces a worm-eaten appearance. The surface color of a gonorrhœal joint is always pale, and we will have a gloss of the integument seldom seen except in tubercular arthritis. The deposits of a gonorrhœal arthritis, unlike the rheumatic, are slow in undergoing resorption, and may often linger in an organized form in sufficient volume to thereafter leave a weakened limb with defective joint action.

The rôle of the gonococcus in this malady is yet unsettled. It would seem from the evidence that when the microbe is found it is a question whether its presence may not be a mere coincidence rather than an active factor in effecting pathological changes. If we were assured that gonorrhœal arthritis were attributable to a specific germ

infection, then the therapy would be clear, when we would neutralize the toxic agent with an appropriate antiseptic.

In the most virulent cases which have come under my own care the aspirated fluid was found by the bacteriologist to contain no gonococci; while, in other cases which run a mild course, it was said that the gonococcus and sometimes the diplococcus were seen in large numbers.

In the near past it was taught, almost as an immutable doctrine, that there was no tubercular lung without Koch's bacillus. But in a little while, as we wind around the circle we reach about the same line we started from; for it has been recently again and again demonstrated that a lung may be riddled with the millet-seed granules when the specific germ is nowhere to be found.

The pathological connection between a urethritis and the type of arthritis here considered is yet an unsolved problem from a scientific standpoint. But if we would assent to Hunter's views, which were at one time generally accepted, the connecting link is clear. He insisted on the unity and identity of *all* venereal diseases. The French school overthrew this theory. But, at the risk of the rack and professional condemnation, I will venture to predict that in the near future Hunter's views will be revived, for there is no scientific proof that there is not a very close affinity in the pathological elements of all venereal maladies. Hunter's dictum, it is true, had but an empirical support; but many of our most generally accepted doctrines rest on the same shaky foundations, and depend for confirmation almost wholly on the therapeutical induction. Once admitted that gonorrhœa and syphilis belong to the same family, the road is clear for direct and vigorous measures. But, candidly admitting that we know nothing about its essential elements, then our safest course will be to amuse our patient with homœopathic granules and leave the disease to Nature.

Diagnosis.—The diagnosis of gonorrhœal arthritis is often attended with considerable difficulty; therefore, if one is not cautious, it may be confounded with rheumatism or tubercular disease. It is unlike rheumatism in many cardinal features. First, there is not the same intense, fluctuating pyrexia, exhaustive perspiration; the urine is free from the excessive deposits and saturation of the phosphates. Cardiac implication is unusual. The disease is generally mon-articular; its onset is gradual. It is said to be most frequennt in the male, and to more often seat itself in the knee-joints. But, in my experience, these allegations have not been supported in their entirety.

The one symptom more common and valuable than all others is the persistence of pain and inflammation in *one* articulation. Another is the chronicity of the effusion into the joints. Unlike rheumatism, surface hyperæsthesia is not, as a rule, present, so that, in order to elicit pain, some slight pressure is needed. In gonorrhœal arthritis the joint

is immovably fixed and cannot be moved for a considerable period without great pain. The soft parts above and below the articulation are very sensitive. To the sense of touch the surface temperature is much less than in rheumatism. Rheumatic inflammation never runs into suppurative changes within the articulation. But suppurative inflammation is not uncommon in severe forms of gonorrhœal arthritis.

When one is reasonably assured that the arthritis is of a specific or urethral origin, then he should inquire as to whether the patient has suffered from gonorrhœa or has exposed himself. With a married woman it is well, unless there are special reasons, to limit one's inquiry to the husband. A patient dislikes extremely to have any one pronounce his joint distraint as traceable to a gonorrhœa. When the wife is the victim of his indiscretion, unless great pressure is brought to bear, the husband will deny his guilt.

When gonorrhœa is present, it definitely decides the character of the disorder. With men it is usually in the declining stages of the malady that the joint troubles begin, though there are certain individuals in whom the rheumatoid pains are coincident with the urethral discharge.

In women, in whom leucorrhœal discharge or vaginal catarrh is so often prevalent, the mucous secretion has no diagnostic value. Certainly, when the discharge is muco-purulent, and the vaginal mucous membrane is intensely red and deeply congested, little doubt can exist.

With the female it may be said that this type of metastatic inflammation is always attributable to an acquired infection. Little has been said on this point by syphilographers, probably because their *clientèle* is composed mostly of the male sex.

Another differential proof when rheumatism is suspected is the so-called "therapeutic test." In genuine gonorrhœal arthritis, colchicum and the alkalies make no impression, and the disease continues its unabated course.

The greatest difficulty will arise in recognizing the mixed cases, especially the strumous or so-called tubercular. But it is of vital importance in this class to distinguish their precise character; for tubercular arthritis in the adult is a malady generally incurable, while the gonorrhœal joint may be preserved. Adult tubercular arthritis seldom exists without pulmonary complications and other constitutional symptoms, which indubitably stamp its true character. Strumous disease pursues a very chronic course, and is attended by a low grade of inflammation. Gonorrhœal arthritis rarely involves the cancellous heads of the bones, while tuberculosis often destroys them. Bearing these general outlines of contrast in view, we will seldom confound one malady with the other, though more than ordinary powers of discernment in many instances will be required.

PROGNOSIS.—When gonorrhœal arthritis passes the first stage, effusion, hyperplasia, and tumefaction are well advanced before professional aid is called, the full functional power of the joint is never again entirely recovered, varying degrees of ankylosis remain, and trophic changes in the soft parts with wasting of the limb will follow. Stiffness and weakness will follow with a damaged joint. In rare cases the limb must be sacrificed in order to save life.

Nothing need be said of the common, mild, ambulant cases, as only the superficial parts suffer, and then but transiently. But with the genuine severe type we always have before us a serious malady to confront. As this disease is not common in the country, many practitioners in their entire lives may never see a case, and hence cannot appreciate the gravity of prognosis. Much will depend, without doubt, on the early and active character of treatment. Of all surgical maladies this is one from which the therapeutical nihilist should stand aside, for it shoud be treated promptly and energetically, or a crippled limb will remain. Should it not, the disease will run a very tedious and painful course. Let us, then, when we have recognized the nature of the malady, warn our patient what he may expect, so that he cannot in the end charge us with deceiving him as to its true character. Let us not forget that sometimes the most painful forms of ophthalmia, meningitis, and pericarditis develop in the course of this arthritis, and thereby aggravate the distress and add fresh dangers to life.

TREATMENT.—Shall the treatment of gonorrhœal arthritis be local or general, or both? Shall medical or surgical measures predominate?

Modern authors give us practically nothing under this head. In Osler's late work on the *Practice of Medicine* the writer inclines to the belief that surgery can effect more than medicine; that incision into the joint, with antiseptic flushing and drainage, is the most efficient measure. In Péan's recent extensive system of surgery[1] the author, in joint-inflammation "*des Arthrites*," in summing up their therapy includes blenorrhœic arthritis with the others, adding no special treatment. In Réclus' and Duplay's suberb volumes on modern surgery[2] likewise no special line of treatment for this malady is directed. All our modern American authors give us little on this phase of arthritis. Like our French confrères, they seem content with pressure, immobilization, and prolonged rest.

Of recent distinguished American surgical writers and teachers, Dr. J. William White seems to be the only one who recommends energetic medication at the outset. He reports excellent results by the free use of quinine and the biniodide of mercury, the former in doses from five to ten grains three times a day, along with $\frac{1}{10}$ grain doses of the latter, until an impression is made on the disease.

[1] Maladies Chirurgicales, vol. vii.

[2] De Chirurgie generale, vol. vi.

Effective remedial measures, however, are efficient in practically all cases of gonorrhœal arthritis, if we can see the cases before organic changes have taken place in the joint. These should be constitutional and local. The former may be divided into antiphlogistic and sedative, the latter into detergent and orthopædic.

For internal administration mercury occupies the first place. First as a purgative and hepatic stimulant, and secondly in small, but oft-repeated doses, as an antiphlogistic. Mercury has long been known as an agent which acts with energy on acute or inflammatory processes, with specific power on *lues venerea*—on those venereal maladies which waste and destroy. But to realize its full potency it must be plied vigorously and early. Given late its action is rather baneful than otherwise. It may be administered by inunction, fumigation, hypodermatically, or *per orem*. In any event it should be plied with a free hand until there are signs of amelioration or its toxic action is becoming manifest, when it should be discontinued. At the same time, if the pain is yet very great we may prescribe such sedatives as may be demanded. If we suspect a malarial, rheumatic, or strumous complication, quinine, colchicum, and the alkalies, or cod-liver oil should be freely given. It goes without saying that the body should be at complete rest; in a comfortable posture, such as gives the greatest comfort.

Local treatment is essentially revulsive and orthopædic. I would place the local abstraction of blood as the most effective of all local measures in the early acute stages. Although there is said to be some objection to leeches, yet I have never seen any reason to reject them. In the full-blooded plethoric they act the best; but even with the anæmic, unless tuberculosis is present, they are equally efficient. The affected joint should be studded with from ten to twelve of them. They may be re-applied with advantage in many.

One of the first subjective effects following their action is the relief of pain; hyperæsthesia has disappeared, and the joint may now be manipulated without giving the former agonizing pain. The pain assuaged or abated at the seat of disease, sleep returns with increased appetite, and convalescence is established.

I could never see how any sort of an orthopædic apparatus served a useful purpose in the early stages of the disease. The joint certainly now needs no fixation adjustment, for the whole body is at rest and safe from any traumatic influence. But, when the intensity of the malady has passed over now, as the joint is temporarily crippled, a comfortably adjusted bandage serves a most valuable purpose.

Protracted immobilization in plaster-of-Paris is of little use unless the joint is hopelessly destroyed, when the support which it contributes fixes the articular surfaces until ankylosis is complete. The same may be said of extension or counter extension apparatus.

It is almost needless to add here that under varying circumstances in individual cases the treatment must be varied, and that he who is most fertile in therapeutic resources will have the best results. Hot or cold applications, emollient poultices, rubefacient plasters, and even the actual cautery, each and all have their place.

Surgical intervention is occasionally demanded in grave cases of this disease.

The injections of antiseptic solutions have been recently recommended in tubercular disease of the joints, and if useful with them should have some value in other infections. Iodoform, corrosive sublimate, carbolic acid, and chloride of zinc have been tried. They have never succeeded in my hands in accomplishing what was promised of them.

When we are assured by aspiration that suppurative changes have advanced and constitutional disturbances are well marked, then an incision into the joint, with free irrigation, should be tried. But, when pathological processes extend into the heads of the bones, lavage and drainage make no impress on the disease. When the articulating surfaces have been honeycombed by erosions and penetrating ulcers the joint must be sacrificed.

It now remains for the surgeon to decide between resection and amputation. As the system in these desperate cases is in a depraved state and the recuperative powers are very feeble, the only means which holds out any hope of saving life is an amputation.

NOTES ON CASES.

CASE I.—M. B., aged twenty-seven years; single; female. She said that six months previously she was suddenly taken with a severe pain in her left knee-joint.

She never had rheumatism; that her first medical attendant had treated this trouble, assuming it was that disease. She called in another practitioner after being laid up two months.

This was the 1st of March, 1888.

Now her limb was put in a fixture, with weights on the heel. Then plaster-of-Paris was applied; but all to no purpose. On the 2d of July she was sent to the hospital to have the joint resected, on the assumption that she had tubercular arthritis.

Condition on admission. She was of a pale, waxy color, with a very feeble circulation, markedly emaciated. Temperature 100¼°; pulse 96. She gave no hereditary history of tuberculosis. She had no cough, but had night-sweats; now had no appetite and little sleep.

As the muscular tissue in the left leg was greatly wasted, the knee-joint seemed considerably enlarged.

The limb had many of the characters of "white swelling." Slight motion in the joint, but it was very sensitive. The pain was constant and excruciating.

She was ready to submit to anything which would relieve the pain. She was ordered to bed and directed to place the limb in such a posture as gave her the greatest comfort. This was the flexed posture, the limb

resting on its side. A large fly-blister was applied, and mercury with potash ordered to be taken internally.

It was noticed after a few days that her exacerbations of pain were the greatest on each alternate day; then ten-grain doses, three times a day, were given.

After this she commenced to improve, and she left the hospital after the fifth week, when she could walk without crutch or cane. She came in as an out-patient for a time, when she returned to her work as a dress-maker, with a stiff joint.

The pathology of this case would have remained a mystery had she not, after much persuasion, admitted that she had gonorrhœa, and was under treatment for it when her knee-joint trouble began. When closely questioned on the point, she said she remembered that the knee-joint trouble commenced when the discharge stopped.

CASE II.—Patient, a male, single, blacksmith, aged twenty-six years, came into Harlem Hospital same summer as the preceding. He had suffered from knee trouble more than two months before entrance. Father and mother died of consumption; always had good health until the trouble came on. Entered hospital for resection of the right knee-joint.

Condition on entrance. Short, stout build; can get around on crutches only. Pulse, 90; temperature, 99½°. Has been a heavy drinker, and has had gonorrhœa four times. Had a gleety discharge when he was seized with the knee-pain. Has a fair appetite, but can sleep very little, owing to the pain in the affected joint.

The right leg was carried in a flexed position at an obtuse angle; some motion in the joint. The synovial pouch distended by a fluid accumulation. Not so much wasting of the limb.

There was no evidence of erosion of the limb, and hence he was advised to submit to further tentative treatment. But as he had suffered so much, and was assured that resection would at once rid him of his infirmity and quickly restore him to health, he was unwilling to have anything else done. But when he was informed that resection meant the complete destruction of the joint, and should it succeed he never could shoe any more horses, he changed his mind and decided to do what was recommended.

He was at once placed on mixed treatment. The joint was blistered twice. His improvement was gradual, but steady. He left the hospital on the fiftieth day after entrance, and though he yet limped slightly he soon returned to his work as a horse-shoer, and when last heard from had a useful limb.

This case was another in which tubercular arthritis had been diagnosticated and the joint condemned. The chief conspicuous feature connected with it was the absence of severe constitutional disturbance.

CASE III.—Patient was a female, aged forty-eight years; domestic; was ill two weeks when I saw her.

History. Patient gave no antecedent nor personal history of rheumatism or tuberculosis. She said that she had good health until she was married, something more than two months before; said she had the

"whites," but that they had become very yellow, and caused a burning pain in urinating.

For two weeks her left knee was so painful and swollen that she was unable to walk on the limb affected; had become so painful now that she could neither stand nor walk.

Temperature, 101¼°; pulse, 108.

Constitutional disturbances pronounced.

Her husband, who was fully thirty years her junior, and who was said to have married her for her money, denied having the clap.

The case had all the characters of gonorrhœal rheumatism, and so it was regarded and treated. She soon after passed from under the doctor's observation and was lost from sight.

In this case the diagnosis was decided on by exclusion. The doctor had culture-tests and microscopical examinations made of aspirated fluid, but neither the bacilli nor cocci could be found.

CASE IV.—Patient a young man, married only six months. Never had gonorrhœa. Came to me, using a crutch and stick.

History. His family were rheumatic. Never had joint disease before.

Three weeks before was suddenly seized with lancinating pain in the right knee-joint. Has had severe pain in joint since, and for two weeks could not leave the house.

Had no reason to suspect his wife's virtue, but admits having had intercourse with her before the catamenia had ceased.

Condition on admission. Temperature, 99°; pulse, 87. Had lost flesh and is very anæmic. Has poor appetite and gets but little sleep, as the pain in the joint is much worse at night than in the day.

The joint is but slightly swollen. No effusion. Tenderness and pain rather more at the insertion of the tendons than elsewhere.

Was ordered iron and arsenic, with mercury in alterative doses.

A flying-blister was applied on joint.

His improvement was rapid, so that within six weeks he was able to return to his place as a telegraph operator. Some ankylosis remained in the joint.

There was nothing of special importance to note in this case except one circumstance. He said that when first taken ill the young physician who was called in aspirated the joint, and reported to him that he had found in it the gonococci; hence informed him that he must have contracted the malady from some infected source, and that ankylosis was almost sure to follow.

CASE V.—Patient a salesman, single, aged twenty-seven years. Has had gonorrhœa several times. When called to see him he had been ailing some days. Was at home eight days from the store. He now had marked and severe constitutional disturbances, though the joint was not very painful. There was a large effusion into the synovial-membrane of the right knee joint.

At the time the joint inflammation commenced he was suffering from a gleety discharge of the urethra, which ceased when the joint trouble began.

About two drachms of the sero-synovial fluid was aspirated from the knee-joint.

This on straining and mounting showed the presence of gonococci.

For the first few days his case promised to run a moderate course, but about this time he had a relapse, with a return in an aggravated form of all his previous symptoms.

The joint was now freely leeched; opium had to be freely administered to relieve pain, and calomel in ½-grain doses was given until the gums were touched.

His case ran a very severe course, and on subsidence of inflammation the joint was more or less ankylosed. He seemed to keenly feel the stigma of being the victim of a venereal malady. When he was able to be about he called on a surgeon in this city, who informed him that gonorrhœa had nothing to do with his condition, and that it all came from "cold."

The case was one of that severe type which could be traced to venereal urethritis, and the gonococci were present.

CASE VI.--Patient married, 30 years old; bartender. No rheumatic or tubercular history. This young man had been under treatment two weeks when I saw him, his case being regarded as rheumatism.

On inquiry it was revealed that he had recently had clap, and was recovering from it when he was stricken with urethritis.

At the time I first saw him he was in great distress. Temperature, 102°; pulse, 114, full and bounding. Great bodily weakness, no appetite, and no sleep, except under morphine.

Has acute urethritis in the left ankle-joint. The swelling is considerable, and surface sensation extremely hyperæsthesic. Surface scrubbed and joints punctured. About half a drachm of turbid serum was removed and put into a sterilized vial. A dozen leeches were immediately ordered, a colchicum purge recommended, after which mercurial inunction was detected, as his stomach was extremely intolerant.

A microscopical examination of the fluid removed from the joint showed that no gonococci were found.

Under the prompt antiphlogistic treatment ordered relief was almost immediate, though his convalescence was tedious, and it was nearly four months before the joint would suffer any weight on it, during which time he had to move on crutches. I saw him a year after he passed from under my care, when I noticed that he walked without a limp, though he informed me that the joint was yet weak.

This was a case in which bacteriological examination gave negative results, and again demonstrated the salutary effects of antiphlogistic treatment.

CASE VII.—Patient an Italian, sent into Harlem Hospital from Out-Patient Department. His knowledge of the English language was so deficient that little or no history could be gleaned from him.

He was sent in for treatment of an arthritis of the left elbow-joint. All the usual rheumatic remedies had been tried, but in vain. As he was very anæmic and rapidly wasting, he was supposed to be suffering from tubercular arthritis; such a condition as required an arthrotomy and drainage. On entrance the joint was aspirated and one drachm of a yellowish-white substance removed.

On physical examination nothing was found which bespoke either

tuberculous or rheumatic inflammation of the lungs or heart. On a sort of milking pressure on the urethra a gleety, gelatinous fluid oozed through the meatus.

Temperature, 101⅙°; pulse, 112.

He was now a very weak and sick man.

Was placed in bed; quinine, opium, and mercury given internally. The arm was placed in a movable sling, and a large fly-blister was applied to the joint.

The examination of the aspirated fluid revealed an abundance of gonococci.

His improvement, though very slow, was steady. He left the hospital three months after entrance, with some ankylosis at the elbow, a wasting of the entire arm, and some stiffening in the wrist and finger-joints.

This was one of those cases in which a diagnosis had to be based on objective symptoms alone in the beginning. The moderate ankylosis of the fingers was attributable to an extension of the plastic inflammation from the joints to the condyloid muscles which act on the digital articulation.

Case VIII.—Patient a married woman, aged thirty-four years. She had recovered from the acute stages of the malady when I saw her. She had been sent to me by Dr. George V. Hann, of this city. She had been under the care of another physician for some months, and as an action had been commenced against the latter in the Supreme Court for malpractice she had been sent to me for an examination and a statement of her condition at this time.

At the time I found her in fair bodily health, as all inflammation had ceased, and there remained only moderate ankylosis and wasting of the limb.

It seems that some six months before she was suddenly taken with severe pain and swelling in her right elbow-joint. This went on to suppuration. The medical attendant, finding that the joint affection was wanting in the true characters of rheumatism or tuberculosis, suspected gonorrhœal infection. She had been confined but about two months when she was taken ill. The husband, it appears, at first denied that he had exposed himself, but later admitted that after her confinement he had a urethritis.

When the doctor's bill came in for treatment, an action was commenced against him, and the husband again strenuously denied that he ever acknowledged he ever had gonorrhœa.

Case IX.—Patient a female, *demi-monde*, aged twenty-two years, single. Father died of pneumonia at forty-five. Mother yet alive and well. Never had rheumatism. Always enjoyed good health until present trouble. Says she went to a ball, danced and became very hot, one night last January. A few days later severe pain commenced in the left knee-joint. At first she was treated for rheumatism, for four weeks, when an abscess opened in the popliteal space. Another medical attendant was now called, who sent her to a hospital.

She was at first under the care of my colleague, Dr. Chas. B. White, at the Harlem Hospital, who turned her over to me on the expiration of his term of service.

At time of entrance and now, extremely anæmic, highly feverish and

very nervous. She was very greatly broken in health, and said that she had lost forty pounds in weight since her illness began.

Her skin was of a marble whiteness, her appetite was very poor, had constant thirst, incessant pain, and almost no sleep. Her general appearance would suggest septicæmia.

The entire left lower extremity had a most unhealthy aspect. The leg and foot are greatly enlarged by a bloating œdema; the skin covering which is cool and bloodless. This œdema extended into the thigh. The knee-joint was swollen and fixed in a flexed position. On motion a grating crepitus was felt within the joint, as the articular surfaces were rubbed together. Under ether, when a more complete examination was made, it was evident that the chief anatomical structures of the joint had been destroyed by ulcerative processes.

She confessed to having gonorrhœa at the time she contracted the synovitis. Physical examination revealed no evidence of tubercular disease of the lungs.

The only question now to decide was, as to whether a resection or amputation should be performed; for pre-incision, grattage, irrigation, and draining had been fruitlessly tried.

Amputation was decided on, as her general condition was such that it was clear she could not endure the shock of a resection, which would occupy so much time, and besides, there seemed no possible prospect of the bony surface fusing after operation.

On the day of amputation her condition was most deplorable. Her temperature was $103\frac{2}{5}$, and pulse 150, thready and hardly countable.

She was gradually inebriated with small doses of brandy, commencing in the morning; the limb was thoroughly prepared and everything gotten in readiness; and at three in the afternoon she was placed on the operating-table and given but a few whiffs of ether, not more than one-half ounce being inhaled, when the heavy amputating-knife was carried at one sweep through all the tissues, from the skin to the bone; the femoral artery being compressed by an assistant. Now, all the tissues were pressed backward over the bone in an upward direction and the saw sent through. The vessels secured, the flap, composed of the tissues *en masse*, was then closed and dressings applied. Patient rallied well, and has since made a good recovery. The removed knee-joint I have presented to the New York Pathological Society. Drs. H. P. Loomis and Reginald Sayre said that the pathological changes did not have the characters of tubercular disintegration.

Microscopical examinations have been repeatedly made of the lining of the joint, but neither the tubercular bacillus nor gonococcus has been found.

This case was one in which the disease pursued a most rapid and destructive course. It was one in which tuberculosis would have been suspected were it not for the clinical history. This was finally disproved by the bacteriological examination.

Case X.—This patient was a female, aged thirty-one years, married. It was four weeks after confinement when I saw her. The patient, a wiry little woman with a good family history, had enjoyed excellent health until April last. She was within ten days of being confined of her fifth child.

Early that morning she noticed a painful swelling on the anterior surface of the left wrist. Within six hours the entire wrist was involved, producing a pain which she figuratively described as if the hand were being wrenched off. This pain increased in severity without intermission day or night until her child was born ten days later, after a natural and easy labor. For a few days after this incident the pain was not so unbearable, and assumed an aching character with the sensation of the presence of fluid in the joint.

A week after delivery, April 21st, when I saw her for the first time, the whole hand and wrist were swollen and œdematous. The tenderness to pressure was particularly marked on the radial side of the wrist-joint, and seemed to radiate thence to the rest of the wrist, the carpus, and carpo-metacarpal joint of the thumb. Any motion in the wrist-joint was attended with excruciating pain. Signs of inflammation were always absent from every other joint, and consequently I had to do with a monarticular inflammation. The febrile symptoms were pronounced. The nerve energy was well nigh exhausted by the now unmitigated pain. The child now a week old had just developed a purulent ophthalmia to a remarkable degree.

A gonorrhœal agency suggested itself, but the mother asserted positively that she had not had any vaginal discharge during her pregnancy; yet there might have been some delicacy which forbid any such admission, for with Dr. Maher's aid the truth was extracted from the husband that he had had something of the kind five months before the child was born.

The treatment applied to the case as gonorrhœal arthritis consisted of absolute rest to the joint with firm pressure, a sufficient quantity of morphia to relieve the pain and allow sleep at night, and tonic of $HgCl_2$, Fe, et As. The relief was prompt and progressive to the extent that, at the end of one month the pain and swelling had been entirely relieved, leaving, of course, the usual stiffness of the fingers and wrist. At the end of the second month she was doing all her own household duties.

I might here remark that the temporary relief experienced after confinement seems to me to have had a threefold agency: 1. The throes of labor rendered the wrist pain insignificant in comparison, and consequently more endurable. 2. The loss of blood at the time may have acted as a revulsive measure. 3. The increase of fluid within the joint offered some resistance to the force of attrition between the opposing layers of the serous membrane.

This case, it will be noticed, was at its worst after the puerperium, as with Dr. Hann's case. They undoubtedly are the same joint affections which some authors regard as caused by auto-infection after labor, but which, no doubt, if all the facts were known, could in most cases be traced to the husband. The doctor informs me that some ankylosis of the wrist and fingers remains.

CONCLUSIONS.—These ten cases taken together present many salient features well to be borne in mind by those called on to treat these cases, and in many respects it will be noted that they presented several characteristics not in harmony with the views of the generality of writers.

First, with reference to the diagnosis. This is not difficult to decide when the differential characters of rheumatism or tuberculosis are remembered. In all my cases except one there was undisputed evidence of gonorrhœa, though the specific microbe could not be found in all.

Indeed, M. Ch. Aubry,[1] who has made an extensive study of the subject, affirms that gonorrhœal synovitis or arthritis is always caused by a specific urethral microbe, not the gonococcus, and that when only the latter is present clap always pursues an uncomplicated course. Lang, Judassohn, Heissler, Reblaub and others are cited by him as supporting a similar position.

In none of my cases did perfect functional restoration follow the disease. Hence, urethral arthritis must be regarded as one of those diseases in which complete resorption of inflammatory deposits rarely if ever occurs.

My observations lead me to ignore the general view that it is a masculine disease, as in my cases there was an equal proportion in each sex. Prof. Sonnenburg, of the Moabit Hospital in Berlin, in whose service I saw several of these cases, informed me that this was his experience, also.

The treatment must be energetic and antiphlogostic. Mercury, if given early, exercises a most salutary influence in the course of the malady. If rheumatism is suspected as a complicating factor, then colchicum with the alkalies are useful.

The local management of the affected part is important. In the early stage free abstraction of blood; later, blisters, lotions, the bandage etc. After the acute stages have passed, then moderate motion should be instituted if we would avoid or limit ankylosis.

MYOMECTOMY AS A SUBSTITUTE FOR HYSTERECTOMY.[2]

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The objection to hysterectomy, *i. e.*, the removal of the uterus with the tumor, since it deprives the woman of her reproductive function, is self-evident, and raises the question whether, in a certain proportion of cases at least, we may not have recourse to a substitute for hysterectomy which shall adequately remove the disease and at the same time preserve in whole or in part the uterus and its appendages. We already have this in the abdominal operation for pedunculated myomata and in the

[1] Gazette hebdomadaire, March 4, 1893. Bactériologie clinique du Chancre et des Blenorrhagiques simples et compliqués.

[2] Read before the American Gynecological Society, May, 1894

vaginal operation for intra-uterine and submucous myomata not larger than the fœtal head, and in the operation through the sacrum after the method practised by Kraske in hysterectomy for cancer. This incision of Kraske has been used, and may possibly have a limited application for the removal of myomata situated in the posterior walls of the uterus near the plane of the os internum.

The special object of this communication, however, is the presentation of an operation for the preservation, whenever practicable, of the reproductive organs in the surgical treatment of uterine myomata by laparotomy. Five years ago I reported to the Chicago Gynecological Society a case operated upon in St. Luke's Hospital, in which the abdomen was opened, the tumor was enucleated, and the cavity from which the tumor had been taken was stitched into the abdominal wound by means of catgut sutures. These sutures approximated the margins of the visceral peritoneum, covering the uterus to the margins of the parietal peritoneum around the abdominal wound—that is, the wound into the uterus was stitched to the abdominal wound after the principle of Volkmann in the treatment of abscess of the liver. The principle is the same as that popularized by Tait in the surgical treatment of pelvic abscesses. In the performance of the operation temporary hæmostasis is secured during the operation by the usual rubber ligature around the lower part of the uterus below the plane of the os internum; this ligature is usually applied before the enucleation. As soon as the tumor has been removed, the margins of the uterine wound are drawn firmly up into the abdominal wound by means of hæmostatic forceps in the hands of assistants. Then the temporary rubber ligature is loosened, but not sufficiently to cause excessive hemorrhage, and the numerous bleeding-points in the bed of the tumor are rapidly caught up by numerous hæmostatic forceps. Permanent hæmostasis is now secured by isolated catgut ligature of each bleeding-point. If parenchymatous bleeding is excessive, this is controlled by quilting the surfaces of the bed of the tumor. This quilting process is desirable also because it folds the surfaces of the cavity from which the tumor was enucleated upon themselves, and thereby greatly reduces the size of the cavity. It should therefore be done in all cases where the tumor cavity is large, even though not necessary, as a means of hæmostasis. In some cases hemorrhage will persist despite the isolated and quilting ligatures. Then it is necessary to tie the uterine arteries. I prefer the isolation and ligaturing of the arteries themselves to the ligaturing of the vessels with their surrounding structures *en masse*. In a recent case in which the tumor cavity extended deep down into the uterus, and in which the walls were quite thin, I ligatured on either side *en masse* by passing the ligature from a point inside of the tumor cavity out to a point in front of the broad ligament, through the broad ligament below the uterine artery, back again from

a point on the other side of the broad ligament into the tumor cavity. The advantage of this manner of ligature is that it confines the ligature for the most part to the tumor cavity and leaves the peritoneum clear.

Permanent hæmostasis having been secured, the temporary rubber ligature is removed and the wound opening into the tumor cavity is stitched into the lower part of the abdominal wound. The sutures should be passed not at right angles but parallel to the margins of the wound and should be locked upon one another—*i. e.*, they should be so placed that the line of union will be secured by a chain of sutures extending around the margin of the opening into the tumor cavity, each suture making a link of the chain. It is essential that the opposing surfaces be accurately and thoroughly brought together throughout in order to exclude sepsis and to secure adequate union.

Before closing the abdominal wound, the left hand is introduced back of and under the uterus so as to steady it while the tumor cavity is being tightly packed with a continuous strip, two or three inches wide, of borated gauze. This secures hæmostasis and drainage. I have had two cases of almost fatal poisoning from iodoform and bichloride of mercury gauze. Now the gauze sponges or sea-sponges which had been packed around the uterus, in order to protect the general abdominal cavity and to absorb blood, are removed; the omentum is drawn down to the uterus and the wound is closed. The gauze drain is removed at the end of a week. If removed earlier, before strong union has taken place between the visceral peritoneum at the margin of the uterine wound and parietal peritoneum at the margin of the abdominal wound, the sudden contraction of the tumor cavity may result in the breaking up of this union and may cause a communication between the abdominal cavity and the tumor cavity; this accident occurred after my second operation by this method and caused the death of the patient. The only other fatal result in an experience of five years, by this method, was from slow hemorrhage, which continued for about five years. In this case the uterine arteries should have been ligatured.

During the first three of the five years since the report of my first case, I used the method in only a limited number of cases, having been discouraged on account of the two deaths already mentioned, which occurred during this period. In the past two years I have operated about twenty-five times, with no mortality whatever. In a majority of these cases I have removed the appendages, and in some of them, as I now think, unnecessarily. The proportion of cases in which they have to be removed is decreasing with increased experience. The preservation of the appendages is a matter of the most urgent necessity, and furnishes a strong incentive to conservatism in the surgical treament of uterine myomata, because upon their integrity rests the value of the uterus.

Unfortunately the cases are not few in which their removal is neces-

sary. Myomectomy should be supplemented by the removal of the appendages in the following three classes of cases:

1. Cases in which the appendages are the seat of such disease as would demand their removal under other conditions.

2. Cases in which the enucleation of the tumor or tumors has so injured the uterus as to render it incapable of performing its functions, especially if the injury be such as would cause cicatricial atresia at the uterine ends of the Fallopian tubes. This might be the occasion for the removal of the appendages on one side only. With increased experience this class ought to diminish.

3. Cases in which the uterus contains an additional myoma so inaccessible as to make enucleation extremely hazardous.

When the walls of the tumor cavity are thin, I have frequently divided them on either side at a point near the junction of the Fallopian tube with the uterus; ligatured the tubes and ovaries after the usual manner; drawn the stumps inside the tumor cavity and stitched them there; and then closed the lateral incisions with catgut sutures tied on the inside of the tumor cavity, so that no considerable part of any suture should be in the peritoneal cavity. This has the advantage of making the operation extra-peritoneal, but it is only practicable when the walls of the tumor cavity are thin and the mesentery of the appendages quite lax.

The anatomical result of this operation after recovery is nearly identical with the result of a successful abdominal fixation of the uterus. But the operation is open to the objection of a somewhat prolonged convalescence, and if the appendages are left another myoma may develop. On the other hand, it has the advantage of preserving in a large proportion of cases the reproductive organs—an advantage so great and so apparent as to require no comment. Moreover, hæmostasis and drainage are secured, and the dangers of abdominal infection are reduced to the minimum.

The question whether the uterus should be preserved or removed with the tumor when the appendages have to be taken away, is still *sub judice*. Unquestionably the prime factor in conservatism must be the preservation of the appendages, because when they are removed the uterus becomes physiologically useless. It should atrophy and become rudimentary, *i. e.*, it should undergo physiological removal. It may, however, fail in this, and remaining large become a pathological element, a result so often observed, after the removal of the appendages for pyosalpinx, that recently a strong movement has started, a movement which is now gathering force, for the removal of the uterus also in the surgical treatment of that disease. If we except those cases in which the myoma has been complicated with pyosalpinx, it is not probable that hysterectomy in the surgery of myoma can ever be as strongly indicated as in the surgery of pyosalpinx, because in the former disease the uterus is less liable to

give trouble from suppuration. To remove the myomatous uterus as a universal practice, at the present time and in the present state of our knowledge is, perhaps, too much like punishing a culprit for a crime which he may possibly at some future time commit.

Dr. Senn has recently applied the principle of the method of myomectomy just described to hysterectomy. His modification is useful in those cases of multiple myomata in which enucleation of the tumor and the preservation of the uterus are impracticable. He dissects off the peritoneal and sub-peritoneal structures covering the tumor and uterus, making what he calls a "peritoneal cuff." He carries the dissection well down to the cervix, so as to separate the uterus and tumor from their peritoneal and sub-peritoneal shell. When the peritoneal cuff has been reflected back over the cervix, the cervix is constricted by means of the rubber ligature, and the corpus uteri together with the tumor is removed. The peritoneal cuff is now stitched into the abdominal wound, according to the principle described for stitching the tumor cavity into the wound after enucleation. The stump, constricted by the rubber ligature, sloughs out in a few days.

It would be possible to apply the same principle to Cæsarean section. After the removal of the contents of the uterus, the margins of the uterine wound could be stitched into the abdominal wound, and the uterine cavity packed with gauze. The after-treatment would be the same as in myomectomy. This extra-peritoneal treatment of the uterine wound, with its thorough capillary drainage, may prove safer than the usual intra-peritoneal method of suture; moreover, in case of subsequent pregnancy, the uterus being attached to the abdominal wall, a direct incision into the uterus could, perhaps, be made without invading the abdominal cavity. This would make any future Cæsarean section relatively safe.

The surgical treatment of uterine myomata must not be confined to any one operation. Radical extirpation of the uterus and the appendages is often indicated. I submit whether the preservation of these organs is not often imperative.

TREATMENT OF INOPERABLE MALIGNANT TUMORS WITH THE TOXINES OF ERYSIPELAS AND THE BACILLUS PRODIGIOSUS.[1]

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THIS is a subject which has occupied no small portion of my time and attention during the past three years. Many of you are doubtless familiar with my previous paper, "The Treatment of Malignant Tumors

[1] Read before the American Surgical Association, Washington, May 31, 1894.

by Repeated Inoculations of Erysipelas," read before the New York Academy of Medicine, December 11, 1892, and published in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, May, 1893.

In that paper I gave a detailed report of ten cases treated by repeated injections of living fluid cultures of the streptococcus erysipelatosus, together with a summary of all the cases that I had been able to collect of malignant tumors associated with erysipelas, accidental or by design.

I began my experiments upon sarcoma in May, 1891, having been deeply impressed with the antagonistic and curative action of accidental erysipelas upon a case of recurrent inoperable round-celled sarcoma under treatment at the New York Hospital, in 1884.

I was able to trace the subsequent history of the patient, and found him alive and well in 1891, seven years after the attack of erysipelas.

CASE I.—This case was a recurrent sarcoma of the neck and tonsil, occurring in a man thirty-seven years of age. He had been twice operated upon, once by Durante, of Rome, and the second time by Dr. Bull, of New York, in March, 1891.

The tumor of the neck involved the deep structure too extensively to permit more than partial removal, and the tumor of the tonsil, about the size of a hen's egg, was left undisturbed.

When I began the treatment, May 2, 1891, the tumor of the neck was growing rapidly, and the tonsil tumor had filled the pharynx to such an extent that only liquid food could be taken, and that frequently regurgitated through the nose. He was greatly emaciated, and I began by giving injections of bouillon cultures of erysipelas (one to two weeks old) directly into the tumor of the neck. The cultures were of little virulence, and the reactions following the injections slight; nevertheless improvement followed, and whenever the injections were discontinued the change for the worse was quickly apparent. The injections were kept up the greater part of the summer without ever having produced an attack of erysipelas. Early in October I obtained a very virulent culture, and inoculation was followed by a very severe attack of erysipelas, lasting nearly two weeks. The tumor of the neck broke down in part, and in part was absorbed, while the tonsil tumor diminished in size, but did not disappear entirely. The patient rapidly improved in general health, and without further treatment of any kind; is alive and well to-day, more than three years from the beginning of the treatment, and two and three-fourths years since the last inoculation.

Frequent examinations have been made during this time, and the tonsil tumor has not increased at all in size, showing its malignant character must have been changed.

There remains some induration about the old scars, but this has not increased. There is good reason to believe the patient *permanently cured.*

This method of treatment, viz.: injections of fluid cultures of living streptococci of erysipelas, was carried on in the ten cases that I reported (loc. cit.).

Six of these cases were sarcoma, and four carcinoma—all inoperable. In but four of these did I succeed in producing erysipelas, although

cultures of pronounced virulence were used, and the injections were continued for a considerable time.

However, it was these very cases where I failed to produce erysipelas that proved to be the most valuable, as they furnished a hint as to the best practical method of utilizing the antagonistic action of erysipelas.

While the cases in which actual erysipelas was produced showed a most marvellous and rapid decrease in the size of the tumors (in two cases entire disappearance in two weeks), the cases in which repeated injections of bouillon cultures failed to produce erysipelas were attended with all the general symptoms of an attack of erysipelas, *e. g.*, nausea, vomiting, headache, malaise, and high temperature, but always disappearing within twenty-four to forty-eight hours. The effect upon the tumors was unmistakable. In some cases there was necrobiosis and discharge, in others diminution by absorption without breaking down, and in almost every case there were signs of retrograde action. These changes were always much more marked in sarcoma than carcinoma.

The great difficulty in producing erysipelas, the danger necessarily attending an attack of erysipelas (I myself having had two fatal cases from inoculation), added to the fact that marked improvement followed repeated injections of bouillon cultures, convinced me that a certain portion, if not all, of the beneficial action, was due to the toxic products secreted by the streptococcus rather than to the germ itself.

My first experiments with the toxic products were made in 1892, with bouillon-cultures treated by heat (100° C.). The reaction following injections of this fluid was similar in character to that caused by living cultures, but somewhat less severe. The effect upon the tumors was also slightly less marked, the destructive effect of heat upon most bacterial products being well-known. I very soon began using filtered cultures, prepared without having been subjected to heat. The cultures (obtained from a fatal case of erysipelas) were grown for three weeks at a temperature of 37° C., and then passed through a Kitasato filter. The filtrate thus obtained was put in glass-stoppered bottles, a small quantity of thymol crystals having been added, and kept in a cool, dark place. The elaborate experiments of Roger[1] upon rabbits, in Blouchard's laboratory, in Paris, had proved that the bacillus prodigiosus has the power of intensifying the virulence of the erysipelas streptococcus. I therefore determined to try the effect of a combination of the toxines of the two germs upon sarcoma. The toxines of the bacillus prodigiosus were prepared in precisely the same manner as has already been described in the case of the erysipelas. The preparations were kept separate, and the doses of each ascertained by experiment. These toxines were most carefully prepared for me by Dr. Alexander Lambert, Fellow in Bacteriology at the College of Physicians and Surgeons of New York, to whom I am greatly indebted for valuable aid.

[1] Revue de Médecine, December, 1892.

The effect of the toxines of prodigiosus was not only to greatly intensify the reaction of the erysipelas, but careful experiment with the toxines, singly and combined, in a large number of cases, has confirmed me in the belief that the antagonistic and curative action of the erysipelas is likewise greatly enhanced by the prodigiosus. Six of my earlier cases of sarcoma treated by the toxines of erysipelas and prodigiosus have already been reported (*Reference Handbook of the Medical Sciences*, supplement volume, September, 1893), and they will be only briefly referred to in the present paper.

Since December, 1892, I have treated 35 cases of inoperable malignant tumors with the toxic products of erysipelas and bacillus prodigiosus. Of these 35 cases, 24 were sarcoma, 8 carcinoma, 3 either sarcoma or carcinoma. A careful analysis of these cases, with a brief history of the more important, will, I believe, best conduce to a proper estimation of the value and limitation of this method of treatment.

My earliest case treated with the filtered products of erysipelas and prodigiosus was a large inoperable sarcoma of the abdomen and pelvis, occurring in a boy sixteen years of age. Its transverse diameter was seven inches, and its vertical five. It extended nearly to the umbilicus above, and was deeply attached to the pelvis below. In consistence it was exceedingly hard, and examination by the hospital pathologist of a section removed showed it to be sarcoma. The patient was referred to me by Dr. L. Bolton Bangs as an inoperable case. When the treatment was begun the patient's general condition was bad, and he was confined to his bed most of the time.

Injections of the toxic products of erysipelas combined with small quantities of the products of the bacillus prodigiosus, were begun early in February, 1893, at the New York Cancer Hospital. They were given locally, directly into the tumor, and in slightly increasing doses. The reaction following the injections was severe, and corresponded exactly with that seen at the beginning of an attack of erysipelas. The chill usually occurred within the first half-hour after the injection, though sometimes delayed an hour. Some local redness accompanied the reaction, but usually both local and constitutional signs had disappeared at the end of twenty-four hours.

The toxines were obtained from a fatal case of erysipelas, and were exceptionally strong. The doses given varied between 0.5 c.c. and 1.5 c.c. of the erysipelas, and 0.2 c.c. and 0 3 c.c. of the prodigiosus. Careful measurements made from time to time showed the tumor to be steadily decreasing in size, and on June 1, 1893, it was then two inches in diameter.

The boy was discharged from the hospital June 1, 1893. On August 1st the tumor had almost disappeared, save some enlarged inguinal glands, and a small mass in the right iliac fossa. The boy's general health had entirely recovered, and he had gained ten pounds in a single month.

He has been kept under constant observation since leaving the hospital, and has been working the entire time, enjoying the best of health.

There still remains some enlarged inguinal glands, and a small indu-

ration in the iliac region, yet no increase in size has taken place, and the element of malignancy has apparently disappeared.

CASE II. *Large recurrent sarcoma of the back and groin; entire disappearance of the tumors; no recurrence in fourteen months after cessation of treatment.*—This case is of particular interest, inasmuch as the successful issue was only due to persistent treatment under very discouraging conditions.

The patient, a native of Germany, forty years of age, had a large sarcoma of back (7 x 4 inches), with metastatic tumor the size of a goose egg, in the right groin. The groin tumor was partially removed in January, 1892, but recurred in a few weeks, and grew rapidly. A portion of the primary tumor of the back was excised and examined by Dr. Farquhar Ferguson, Pathologist to the New York Hospital, and pronounced mixed-celled sarcoma—round, oval and spindle celled. In April, 1892, both tumors were rapidly increasing in size, and being inoperable I determined to try the injection of fluid cultures of erysipelas. After giving the injections about two weeks, a very severe attack of erysipelas developed, involving both the back and thigh. Within twenty-four hours a marked change took place in both tumors; softening and necrosis occurred, and within two weeks both tumors had apparently entirely disappeared. The patient quickly regained his general health, but in July of the same year recurrence took place in both localities. The injections were resumed in October, and in November the patient had a second severe attack of erysipelas. Again the tumors almost disappeared, but not completely, and as soon as the attack had subsided growth became rapid. Injections of fluid cultures when given daily checked the growth, but as soon as they were discontinued the tumor increased in size.

In December the patient had three separate attacks of erysipelas, each case mild in character, and lasting but a few days.

In January, 1893, I removed the tumor of the back. The wound was left open and partially covered with Thiersch's skin-grafts. Most of the grafts failed to take, and three weeks after operation sarcomatous granulation appeared at the site of operation. The tumor in the groin, which had recurred, was also increasing in size. Injections of toxic products of erysipelas and prodigiosus were made into the groin tumor only, and repeated every forty-eight hours. Local and constitutional reaction similar to that described in the preceding case occurred.

The flabby sarcomatous granulations in the back at once began to disappear, and the tumor of the groin, which was about the size of an English walnut, began to decrease in size. At the end of four weeks no trace of the sarcoma remained in either locality. The injections were discontinued in March, 1893, since which time no treatment of any kind has been given. The patient quickly regained his health and accustomed weight, and has been attending to his usual work.

At the present time, fourteen months since the cessation of treatment, and more than two years since the beginning, he is in perfect health, with no trace of sarcoma to be found.

CASE III. *Sarcoma of iliac fossa; partial disappearance.*—The patient, aged fifty-five years, was born in Ireland, and had nothing worthy of note in his family or previous personal history. In January, 1893, he noticed a swelling in his right iliac region. It was accompanied by some pain, and grew steadily in size.

When I first saw him, in June, 1893, when he was admitted to the New York Cancer Hospital, there was a tumor about the size of two fists, deeply seated in the right iliac fossa. There was marked pulsation, which was regarded as transmitted, and the tumor was diagnosticated as sarcoma. An exploratory incision was made, extra-peritoneal, and a portion removed and the diagnosis confirmed.

Injections of the erysipelas and prodigiosus toxines were at once begun, and continued, with occasional intervals, the greater part of the entire year. The tumor slowly decreased in size, and at the present time the greater part of it has been absorbed. The patient's health is perfect, and he has recently been discharged from the hospital.

CASE IV. *Inoperable sarcoma of the abdominal wall; exploratory operation; entire disappearance under treatment with erysipelas and prodigiosus toxines.*—Mrs. X., aged twenty-nine years, first noticed a small swelling in the abdominal wall, in May, 1893. This increased in size with considerable rapidity, was associated with a moderate amount of pain and some falling off in general condition.

In August, 1893, becoming alarmed at the size of the tumor, she consulted Dr. Maurice H. Richardson, of Boston. He performed an exploratory laparotomy, on August 31st, through both median and lateral incisions. The tumor was found to involve such a large portion of the abdominal wall, that it was regarded as inoperable, and the wounds were closed, after a small portion of the tumor had been removed for diagnosis. The microscopic examination was made by Dr. Whitney, of Harvard Medical School, and the specimen pronounced sarcoma. As soon as the wound had healed the patient was kindly referred to me by Dr. Richardson, and early in October I began injections of the toxines of erysipelas and prodigiosus. But little reaction followed moderate doses, and it required very large doses to raise the temperature to 101° and 102° F.; 103.6° was the highest point ever reached.

The injections were repeated daily, and within two weeks improvement was very evident. The patient's general condition suffered but little, and she was able to be up and about almost the entire time.

On December 22d I advised her to go to her home for a few weeks, in order to allow the inflammation, caused by the injection, time to subside, so that the exact amount of improvement could be determined. After three weeks she was examined by Dr. Richardson, who found the improvement so marked that he wrote me he saw no reason why she should not be permanently cured. She returned to New York on January 12th, and remained under treatment one month. The tumor had steadily decreased in size, and finally disappeared entirely.

On April 3, 1894, she was carefully examined by Dr. Richardson and myself, and we were unable to find any trace whatever of the tumor. All signs of inflammatory induration had likewise disappeared, and the abdominal wall was apparently normal. She had gained several pounds in flesh, and her general health had never been better. On May 23d, nearly two months later, her condition was the same.

CASE V.—F. K., aged fifteen years, female, was operated upon for fibro-sarcoma of the fourth and fifth metatarsal bones of the right foot, in 1890, at the New York Hospital. Two years later a Syme's amputation was performed by Dr. Bull for local recurrence. Six months later recurrence again occurred in the stump, and shortly after a tumor appeared in the popliteal region. In January, 1894, the girl was read-

mitted to the New York Hospital, with a tumor in the popliteal space the size of a child's head, and one in the stump the size of a hen's egg. The inguinal glands on the same side were also enlarged and indurated.

Operation was performed early in January, 1894, by Dr. Bull, and an attempt was made to remove as much as possible of the popliteal tumor. It was found very adherent to the vessels and nerve, and not being encapsulated, but infiltrating the neighboring muscles, it was impossible to make a complete removal. The tumor in the stump was purposely left untouched, in order to furnish a guide as to improvement from the erysipelas treatment, which it had been decided to try.

The injections were begun almost as soon as the wound had healed, and were given alternately in the stump and groin and occasionally in the calf of the leg. The improvement following the injections has been astonishing. The tumor of the stump has entirely disappeared, the glands of the groin can scarcely be felt, and there only remains a small induration in the calf of the leg. The patient has gained seventeen pounds in weight and has perfectly recovered her health. Whether or not the improvement will be temporary time alone can show, yet the history of the preceding cases gives us reason to hope for a permanent cure.

CASE VI. *Enormous round-celled sarcoma of the neck and thyroid; very marked improvement.*—M. S., female, aged thirty-eight years, a native of Russia, was admitted to the Mt. Sinai Hospital in December, 1893, in the service of Dr. Gerster. There was no history of heredity, and her personal history contained nothing worthy of note up to the date of the beginning of the present trouble. Her occupation, peddling, necsssitated her carrying a heavy pack upon her right shoulder, thus causing more or less irritation to her neck.

Four months previous to her admission to the hospital she noticed a small lump on the right side of the neck just behind the sterno-mastoid muscle. A few weeks later enlargement of the thyroid was observed.

The neck tumor grew with such great rapidity that in four months it had reached the size of a cocoanut, while the thyroid tumor was the size of an orange. This was her condition when I was asked by Dr. Gerster to see the case with a view of trying the treatment of toxines of erysipelas, should it be deemed wise.

The larger tumor was firmly fixed to its base, which extended from the median line behind to the thyroid in front, and from the mastoid above to the clavicle and scapula below. It was markedly protuberant.

I removed a section of the tumor, which was examined by the hospital pathologist and pronounced "round-celled sarcoma." In spite of the large size of the tumor and the great rapidity of growth, I decided it was quite justifiable to try the effect of the toxines.

The first injections were of the erysipelas toxines alone, and doses of ♏xx and xxx, gave a reaction of 101½° with the usual constitutional symptoms, without, however, any chill.

The addition of ♏iij of the toxines of the bacillus prodigiosus to the erysipelas caused a severe chill with a temperature of 104° F., with nausea, vomiting, and some diarrhœa. The condition had returned to normal on the following day.

These, with slightly varying doses, were given at intervals of two to three days for about four months, the reaction temperature ranging between 102° and 106½°.

Her susceptibility to the toxines was but little diminished by the long-continued injections, and, in spite of the frequent and severe reactions, her general condition kept up remarkably well.

As to the effect of the toxines upon the tumor, which is the real question of interest, I can state: the large tumor of the neck not only ceased to grow, but decreased considerably in size, as was shown by frequent and careful measurements. Furthermore, the tumor, which was firmly fixed at the beginning, became much more loosely attached, and the skin, instead of being tense and glistening, became almost flabby. The thyroid tumor also decreased one-half in size, and several smaller nodules in the neck, on the left side, almost disappeared.

The dyspnœa which at the beginning of the injections had become of serious moment, entirely disappeared. The decrease in the size of the tumor was due in part to softening and breaking down, and in part to absorption without softening.

The patient left the hospital a few weeks since with the promise to return for further treatment. This case proves more than almost any other the powerful antagonistic action of these bacterial products upon the most malignant type of sarcoma.

Here we have a tumor the size of a cocoanut, of such rapid growth that it had attained this size in four months, proven to be a round-celled sarcoma by the microscopical examination of an expert pathologist, not only held in check for four months, but markedly reduced in size by the injection of the soluble products of erysipelas and bacillus prodigiosus, without any other treatment internally or externally.

CASE VII. *Very large pulsating round-celled sarcoma of ilium.*—G. H., aged forty-nine, a native of Germany, was referred to me in September, 1893. He had a tumor occupying the whole of the left buttock and bulging into the iliac fossa in front. It undoubtedly started in the ilium, and was twenty-eight inches in circumference. It could be felt by the rectum. It was exceedingly vascular, and the pulsation quite as marked as in an aneurism.

About a year and a half previously, when about the size of a cocoanut, an attempt had been made to remove it by Braun, of Konigsberg, but the hemorrhage was so profuse the operation could not be completed. The diagnosis then made was "round-celled sarcoma," and was confirmed by Kocher, of Berne.

I began the injection of the toxines in September, 1893, and continued them about seven weeks. During the first two weeks I used the same preparation of toxines that had proven so successful in the cases already reported, and during this time the tumor decreased two inches in semi-circumference, and the pulsation nearly ceased. At the end of two weeks I was obliged to use toxines prepared from other cultures of much less virulence, and the effect on the tumor was very slight. No further decrease in size occurred, and pulsation again slowly returned.

He returned to Germany in December, and at the present time is receiving injections of the toxines of erysipelas and prodigiosus prepared by Dr. A. Tavel, Professor of Bacteriology at the University of Berne. A recent communication tells me that the tumor is diminishing yet, with such an enormous growth, permanent results can hardly be expected.

Carcinoma. I have treated eight cases of carcinoma with the toxines. There has been marked improvement in two cases, slight improvement

in four cases, and no effect in the remaining two cases. In no case has the tumor entirely disappeared. A brief outline of the cases will be found in the accompanying tables.

They were all, with one exception, large inoperable tumors. The single exception was a primary carcinoma of breast, about the size of a goose-egg, occurring in a woman sixty years of age. A coexisting heart trouble made it unwise to give an anæsthetic, hence operation was not performed. Injections of the toxines were employed for about six weeks. Unfortunately a few applications of the caustic were applied at the same time, hence the effect of the toxines alone could not be absolutely determined. The tumor entirely disappeared, but recurred two months later. The toxines were again given, and without other treatment the tumor has steadily decreased in size. The case is still under treatment at the present time.

CASE VIII. *Epithelioma of bladder, involving abdominal wall and pelvic bones.*—The following is a very brief history of a most interresting case from many points of view other than the one relating to the present subject.

G. H., aged fifty-seven years, was operated on for papilloma of bladder, seven years ago, by suprapubic incision. Careful examination showed the tumor to be a papilloma.

Five years later his symptoms returning, a second operation was done (perineal section) and a mass, size of tangerine orange, similar in structure to first, was removed. Some epithelial tissue was found in the growths, but it was still called papilloma. Since that time he has been gradually failing in general health, losing large quantities of blood in the urine, and suffering excruciating pain. Last summer, about a year ago, he began to be lame in the region of the hip, and the lameness has slowly increased, accompanied by the appearance of a tumor in the right buttock, due to bony enlargement of the ilium. The whole right groin and region of Scarpa's triangle was also filled up with a hard, bone-like mass. During the same time a hard mass was discovered at site of old suprapubic incision. This increased until in January, 1894, it was four inches across and extended from umbilicus to the symphysis pubis. It was almost of bony hardness, and due to malignant infiltration of the abdominal walls.

I was called to see him on the supposition that the trouble was sarcoma, that diagnosis having been made by a well-known surgeon. A small piece was removed and examined. It proved to be epithelioma. The chances of deriving benefit from erysipelas toxines in such a case were very doubtful, yet it was thought best to try them for a short time.

I began January 7, 1894, at first using small doses every day, and later, larger doses every two or three days. Most careful measurements were taken, with the aid of the family physician. When I began, the hæmaturia was very severe, and he was losing large quantities of blood.

Three months have elapsed since I began, and his condition at present is as follows: The tumor of back and groin are slightly smaller, the tumor in scar has decreased in size and lost much of its vascularity. The hæmaturia, has never returned during the whole period, which, judging from his previous history, can hardly be attributed to anything but the injections.

In regard to general condition: His appetite has remained good. I have not been able to have him weighed, but he has nearly, if not quite, held his own. He does not get about with quite so much vigor as before, but the injections have been pushed, and he has naturally suffered some depression. The injections were left off for short intervals on two occasions, and the speedy increase in size and vascularity were ample evidence that the toxines had a controlling influence upon the tumor, though permanent cure can hardly be considered possible considering the extensive involvement.

CASE IX. *Epithelioma of superior maxilla.*—N. D., aged fifty years; family and previous personal history good. In August, 1891, he had three teeth pulled from upper jaw, one tooth was broken at time and jaw was somewhat injured. Nothing was noticed until February 1, 1893, when a small, flat swelling appeared in the region of the old injury. It soon broke and discharged pus. In April it had grown considerably, and soon after began to be very painful. In June it had reached a large size, and frequently discharged large quantities of pus and broken-down tissue. His general condition was much improved. When I saw him, September 11, 1893, his entire left face was involved, and the jaws nearly ankylosed, allowing him to eat only liquid food. Examination showed growth to be epithelioma. I attempted for more than four weeks to give him an attack of facial erysipelas, using the most virulent cultures at my command. He showed a great tolerance of the injections, and I could with difficulty get his temperature above 100° with large doses. Repeated injections had a decided effect in checking the growth, and considerable decrease in size followed.

After being obliged to give up producing erysipelas, I resorted to the toxic products. These were continued until the end of December. Once the injections were left off for one week, and during that time the tumor grew markedly. The severe pain and suppuration, added to the more or less depressing influence of repeated large doses of the erysipelas and prodigiosus, weakened his general condition, and I did not think it advisable to continue the treatment when permanent cure was impossible. His condition has steadily become worse since, and he can hardly live more than a few weeks.

CASE X. *Carcinoma of breast; recurrent.*—This case is of especial interest, since it is one of the few cases of recurrence seven years after operation.

The patient, aged seventy years, was operated on for carcinoma of the breast in 1884. The tumor had been observed but four weeks previous to removal, and was about the size of a hen's egg, occupying the upper and outer quadrant of the left breast. The breast itself was not excised, neither was the axilla explored. She remained perfectly well and free from recurrence for *seven* years, when she had a local return in scar. A second operation was performed with recurrence in five months.

When I saw her in the latter part of December, 1893, there was a hard tumor the size of two fists occupying the region of the left breast, and extending to the posterior axillary line. It was very firmly fixed to the chest wall, and the overlying skin was discolored, but there was no ulceration. There was also a hard mass, about the size of a hen's egg, above the right clavicle. Movements of the neck were greatly limited and painful. The right arm was markedly swollen and almost useless. The patient had long been a sufferer from rheumatism and

gastro-intestinal trouble, and her general condition was bad. Under such conditions the treatment with the toxines was begun solely with the view of affording temporary relief, permanent cure being out of the question.

My usual method of treatment was in this case somewhat modified, and very small doses were given every day instead of the larger doses every other day. The erysipelas toxines alone were used, and only in sufficient doses to raise the temperature from 99.5° to 100° F. The injections were made into the larger tumor. Before the toxines had been used a month very marked and unmistakable improvement had taken place. The tumor above the clavicle decreased more than one-half, and the larger tumor of the breast was considerably smaller and much more movable. The swelling of the arm became much less, by measurement, and the arm could again be used with comparative ease. Her appetite improved greatly. The treatment has been continued for nearly five months without any ill effects. At the present time the toxines have apparently less effect upon the tumor than at first.

The result in this case is sufficient to prove the powerful controlling influence of the toxines upon carcinoma even under most adverse conditions.

I have found osteo-sarcomata the least susceptible to the influence of the erysipelas toxines. Time will not permit a detailed account of more of the cases, but the chief points will be found in the accompanying tables. Summing up these we have twenty-five cases of sarcoma, eight cases of carcinoma, and three either of sarcoma or carcinoma, treated by the toxines of erysipelas and prodigiosus. If we include my first case treated by fluid living cultures of the erysipelas alone, we have five cases in which it is not unreasonable to hope for a permanent cure.

The first case, sarcoma of neck and tonsils, has gone nearly three years without treatment.

The second, sarcoma of back and groin, fourteen months since the injections were discontinued is perfectly well and free from any trace of recurrence.

The third, sarcoma of abdomen and pelvis, has been in perfect health one year since leaving the hospital, and the very small portion of the tumor that was not wholly absorbed has remained dormant.

The fourth, sarcoma of abdominal wall, which entirely disappeared under two and one-half months' treatment, remains perfectly well and free from reccurrence three months since cessation of treatment.

The fifth, sarcoma of iliac fossa, is well one year since the beginning of the treatment, with the tumor one-third the original size, and the element of malignancy apparently destroyed.

A sixth, recurrent sarcoma of the leg and thigh, in which the tumor of the stump disappeared during the injections, is still under treatment, with no tendency to relapse.

In addition to these six cases, nine others showed marked improvement, eight slight temporary improvement, while in two there was no apparent effect. One of these two was an osteo-sarcoma of sternum, recurrent, of very rapid growth, and but four injections were given. The other was a recurrence following primary sarcoma of testes. The contents of the abdomen and pelvis were so completely involved, and the patient so weak and emaciated, that only very small doses could be given. Under such conditions improvement could hardly be expected.

If it were possible to formulate from such a limited number of cases any conclusions as to what types of sarcoma yield best to the toxines, I should say spindle-celled and mixed-celled, viz., round, oval, and spindle-celled tumors are the most susceptible to the action of the toxines, and periosteal and osteo-sarcomata (round-celled) are the least susceptible.

I have had but one case of melanotic sarcoma, multiple recurrent, which is still under treatment. The toxines evidently have a controlling effect, yet it is doubtful that it will prove curative.

All of the above cases have been kept under constant observation. When we consider that they were all hopeless cases from an operative standpoint or from any hitherto known method of treatment; that in every case the diagnosis was not only established by eminent surgeons, but also confirmed by the microscopic examination of competent pathologists, then only are we in a position to properly estimate the importance of this subject.

In regard to the cases of carcinoma we must, at present, speak with more reservation. In none of the eight cases which I have treated did the tumor entirely disappear, yet the very marked improvement that occurred in the most unpromising cases has strengthened me in the belief that the future treatment of inoperable carcinoma as well as sarcoma lies in this direction. The method of treatment is yet in its infancy, and there is every reason to believe that it can be greatly improved by careful experiment and research.

I believe the secret of the success in the cases reported has been largely due to the combined action of the toxines of the two germs. Although the mutual action of these germs in intensifying the virulence of each other had been demonstrated by Roger in animals, it had occurred to no one, as far as I have been able to learn, to make use of this biological principle in the treatment of malignant tumors.

During the past year I have been experimenting with these toxines prepared in a number of different ways. The method already described, viz: growing the germs separately in bouillon, three to four weeks, and then filtering through porcelain, was adopted in the earlier cases. Later, at the suggestion of Mr. B. H. Buxton, recent fellow in bacteriology at the Loomis Laboratory, I tried a preparation made by growing the

streptcocci ten days in bouillon, then adding bacillus prodigiosus, which was allowed to remain two weeks longer. The bouillon was then filtered, and the filtrate thus prepared was exceedingly active, ten to fifteen minims being sufficient to give a temperature of 103° F. or 104° F. This preparation had, I think, a better effect on the tumor than the former.

As the filter of necessity removes whatever of value lies in the bodies of the germs, I prepared cultures by heating them to 58° C. for one hour. This temperature is sufficient to kill the germs, and probably causes little chemical change in the toxalbumens. Cultures thus prepared were considerably stronger, and the effect on the tumor was apparently slightly greater than similar cultures filtered.

I have recently been using cultures prepared by Dr. Lambert, as follows: Bacillus prodigiosus is grown in streptococcus broth, to which a very little cacao has been added, for four weeks or more, and then the broth is heated one hour to 58° C. The fluid is then used without filtration. This is by far the strongest preparation I have been able to obtain. I have had a temperature of 105° F. follow an injection of five minims, and 104° F. three minims. Whether its effect upon the tumors is proportionately greater than the filtered preparation, I am as yet not wholly convinced. A trial of several weeks in a number of cases has inclined me to believe it to be the best preparation thus far used.

A very important point remains to be considered, and that is the character of the culture used. Cultures obtained from any but a virulent case of erysipelas are of little value. All of my successful cases were treated with toxines from cultures from a fatal case of erysipelas. Without going into the disputed question of the identity of streptococcus of erysipelas and the streptococcus pyogenes, I will say that a large number of experiments with the living cultures of the streptococcus of erysipelas in the human subject have forced me to believe that the two germs are for all practical and clinical purposes distinct, although bacteriologically we may not be able to differentiate them.

The larger portion of this paper has been taken up with a record of facts. These facts are sufficiently out of the ordinary course to call for explanation, if such explanation is possible.

This is neither the time nor place to attempt to solve the problem of the etiology of malignant tumors, nor even to hastily review the arguments for and against the various theories. In my previous paper, a year ago, I outlined the reasons for believing malignant tumors to be of microbic origin. During the past year, although much has been written against this theory, more has been done to support it.

While to my mind no other theory offers a rational explanation of the clinical facts and various phenomena connected with malignant tumors, still less does any other theory explain the action of erysipelas upon such tumors.

Excepting for the moment the micro-parasitic origin of malignant tumors, an explanation of the action of erysipelas is not difficult. In the paper referred to I said: "If a small quantity of blood-serum of an animal rendered immune to tetanus is capable of destroying or rendering inert the virulent bacilli in a fresh case, it is quite as easy to understand that the toxic products of erysipelas might bring about such changes in the blood-serum as to destroy the parasite of cancer. The parasite having been destroyed, the irritation would consequently cease, and this would lessen the hyperæmia of the parts, upon which factor the life of the tumor cells of low vitality largely depends. This theory, if it may be called such, has occurred to me as offering the best explanation of all the facts observed. It explains the rapid degeneration with breaking down of tumor tissue, as well as the slower disappearance by absorption. It also explains those interesting cases, several in number, where an erysipelas remote from the tumor has caused disappearance in precisely the same way as a local attack. These cases prove the phagocytosis theory alone insufficient to explain the action of erysipelas. It is worthy of note that the action of erysipelas upon lupus and the secondary and tertiary lesions of syphilis is similar to that in malignant tumors, and this fact, joined to the fact that erysipelas has never been known to affect non-malignant tumors, is another point in favor of the parasitic origin of cancer."

In view of the results which I have shown it possible to obtain from the toxines of erysipelas and prodigiosus, which can be used with perfect safety and with scientific accuracy, I do not consider it advisable, except in extraordinary cases, to expose a patient to the risk attending an attack of erysipelas. I, myself, have had two cases for inoculation and I know of four others.

The results from an attack of erysipelas are shown by my tabulated cases to be little, if any, superior to those obtained from the toxines. The foregoing cases, I believe, warrant the following conclusions:

1. The curative action of erysipelas upon malignant tumors is an established fact.

2. This action is much more powerful in sarcoma than carcinoma.

3. This action is chiefly due to the toxines of the erysipelas streptococcus, which may be isolated and used with safety.

4. This action is greatly increased by the addition of the toxines of bacillus prodigiosus.

5. The toxines to be of value should come from virulent cultures and should be freshly prepared.

6. The results obtained from the use toxines without danger are so nearly quite equal to those obtained from an attack of erysipleas, that inoculation should rarely be resorted to.

Table of Cases of Sarcoma Treated by Toxines of Erysipelas and B. Prodigiosus.

No.	Sex and age.	Date.	Diagnosis.	Treatment.	Immediate result.	Final result.
1	M. 16	Jan. 1893	Sarcoma, spindle-celled.	Toxines of erysipelas and prodigiosus.	Almost total disappearance of tumor.	No relapse; perfectly well May, 1894.
2	M. 40	April, 1892 and Feb. 1893	Sarcoma, round, spindle, and oval-celled; recurrent	Erysipelas inoculation April, 1892; toxines Feb. 1893.	Total disappearance under erysipelas Apr. 1892; recurred in two months; recurrent tumor disappeared under treatment with toxines.	Well and free from recurrence fourteen months after cessation of treatment
3	M. 46	May, 1893	Sarcoma, round, oval, and spindle-celled; recurred twice; back and axilla,	Toxines; also given one severe attack of erysipelas by inoculations.	Improvement slight, but only temporary; axillary vein resected Dec. 1893.	Under treatment May, 1894, but little prospect of further improvement.
4	M. 55	Feb. 1893	Myxo-sarcoma of thigh; recurred twice.	Erysipelas and prodigiosus toxines two months.	Temporary check to growth; slight decrease in size.	Later increase in size.
5	F. 32	April, 1893	Sarcoma, thigh and pelvis; recurrent; round-celled.	Toxines of erysipelas and prodigiosus, also accidental erysipelas.	Very slight temporary improvement.	Rapid progress of disease later.
6	F. 20	Feb. 1893	Sarcoma, spindle-celled, hand; recurred five times.	Injections at intervals till present time, May, 1894.	Marked improvement; growth checked; decrease in size marked.	Under treatment still.
7	M. 70	June, 1893	Sarcoma, back.	Toxines two to three weeks.	Slight improvement; temporary only.	Rapid increase later.
8	M. 45	June, 1893	Sarcoma iliac fossa size of two fists, six months' duration.	Injections at intervals one year.	Tumor diminished two-thirds.	Patient in good health May, 1894.
9	M. 44	Sept. 1893	Sarcoma, very large, pulsating, round-celled, of ilium.	Toxines seven weeks.	Some decrease in size; marked decrease in pulsation first two weeks; no further improvem't.	Treatment resumed April, 1894.
10	F. 29	Oct. 1893	Large sarcoma of abdominal wall; inoperable.	Toxines two and a half months.	Entire disappearance of tumor.	Patient perfectly well May 23, 1894.
11	F. 59	Oct. 1893	Sarcoma mastoid bone, involving dura mater; recurrent.	Toxines six weeks.	Marked decrease in size; patient's condition did not permit continuing treatment.	Rapid growth after injection left off; death Jan. 1894.
12	F. 55	Oct. 1893	Sarcoma sternum, very large; rapid growth with frequent and dangerous hemorrhages.	Toxines seven months.	Very marked decrease in size, and improvement in general condition.	After five months treatment effect of tonic less marked, and tumor slowly increasing.
13	M. 60	Jan. 1894	Sarcoma superior maxilla; recurrent.	Toxines two months.	Growth checked and some decrease in size.	To return for further treatment.
14	M. 22	Nov. 1893	Sarcoma of abdomen and pelvis; recurrent from testes, sarcoma.	Toxines 1 mo. (small doses); patient's genral condition very desperate.	No apparent effect on condition.	
15	F. 17	Jan. 1894	Sarcoma of leg and popliteal region; recurrent.	Toxines three to four months.	Tumor nearly all disappeared.	General condition perfect; still under treatment.

No.	Sex and age.	Date.	Diagnosis.	Treatment.	Immediate result.	Final result.
16	M. 48	Jan. 1894	Large, recurrent, multiple, myxo-sarcoma of thigh (muscles).	Toxines four weeks.	Temporary decrease in size.	Later, rapid growth and fatal issue in April, 1894.
17	M. 40	Jan. 1894	Large, inoperable, lympho-sarcoma of neck; very rapid growth.	Toxines four weeks.	Temporary check when large doses were used.	Death two months later.
18	F. 30	April, 1894	Very large sarcoma of pelvis and thigh; recurrent.	Toxines seven weeks.	Considerable decrease in size; cessation of pain.	Still under treatment.
19	F. 30	April, 1894	Recurrent sarcoma of carotid involving bone of face.	Toxines seven weeks.	Almost entire disappearance of tumor.	Still under treatment.
20	F. 58	April, 1894	Recurrent sarcoma of superior maxilla.	Toxines two months.	Very marked improvement, tumor about half former size.	Still under treatment.
21	F. 38	Dec. 1893	Inoperable, round-celled sarcoma; neck and thyroid size cocoanut; four months' growth.	Toxines four and a half months.	Very marked reactions; growth entirely checked; considerable decrease in size by actual measurement.	Patient left hospital Apr. 1894.
22	F. 55	May 1894	Recurrent sarcoma inferior maxilla.	Toxines three weeks.	Softening of tumor; slight decrease in size.	Under treatment.
23	M. 37	Jan. 1894	Recurrent multiple, melanotic sarcoma (round celled).	Toxines one month; discontinued; resumed Apr. 7, 1894.	Growth checked; apparent disappearance of sarcoma; appearance of another, other nodules when injections were left off.	Under treatment.
24	M. 50	May, 1894	Sarcoma sternum; recurrent; very rapid growth.	Toxines only form injections given.	No apparent improvement.	

Cases of Carcinoma—Inoperable.

No.	Sex, age.	Date.	Diagnosis.	Treatment.	Immediate result.	Final result.
1	F. 39	Sept. 1893	Recurrent carcinoma of breast (very rapid growth).	Toxines two and a half months.	Slight temporary improvement.	Death January, 1894.
2	F. 37	Sept. 1893	Recurrent carcinoma of breast three times (very rapid growth).	Toxines three weeks	No apparent effect.	Death three months later.
3	F. 58	.....	Carcinoma of breast, size of goose-egg.	Toxines, with addition of a few applications of caustic; recurrent tumor, size of egg, treated with toxines alone.	Entire disappearance—recurred two months later; marked decrease in size.	Under treatment.
4	M. 55	Sept. 1893	Inoperable epithelioma of jaw; very rapid growth—three months.	Fluid living cultures failure to produce erysipelas; later, toxic products.	Growth held in check four months; some decrease in size.	General health fail'd; treatment left off Dec. 1893; rapidly worse since.
5	F. 45	Mar. 1894	Recurrent carcinoma of breast; multiple skin nodules.	Toxines two months.	Slight improvement.	Under treatment.
6	F. 70	Jan. 1894	Recurrent, inoperable carcinoma of breast.	Toxines five months, small daily doses.	Marked improvem't; tumor decreased in size; swelling of arm much less.	Under treatment, but effect less than during first three months.
7	F. 43	Apr. 1894	Carcinoma of breast; inoperable.	Toxines five months.	Slight decrease in size, and supra-clavicular glands much smaller.	Tumor removed; numerous areas of caseous degenera'n apparently caused by injections.
8	M. 57	Jan. 1894	Epithelioma of bladder, abdominal wall, and pelvis (very extensive).	Toxines four and a half months.	Growth checked; slight decrease in size.	Under treatment.
9	F. 34	May, 1894	Epithelioma of lower jaw.	Toxines three weeks.	Reduced in size two-thirds.	Under treatment.

Sarcoma or Carcinoma.

No.	Sex, age.	Date.	Diagnosis.	Treatment.	Immediate result.	Final result.
1	F. 35	Feb. 1894	Probable sarcoma of neck, orbit, and pharynx; rapid growth.	Toxines three weeks.	No apparent effect.	Treatment discontinued.
2	F. 38	Apr. 1894	Malignant tumor of hard palate.	Toxines four weeks.	Decrease in size of tumor.	Under treatment.
3	F. 37	Jan. 1894	Malignant tumor of retroperitoneal region; exploratory operation; inoperable.	Toxines six weeks in thigh and abdomen.	No apparent increase in growth.	Under observation.

Cases of Malignant Tumors Associated with True Erysipelas, and not included in former paper.

No.	Sex, age.	Date.	Diagnosis.	Treatment.	Immediate result.	Final result.
1	M. 65	February, 1893 (Coley)	Sarcoma of neck; recurrent; inoperable.	Erysipelas by inoculation.	Considerable decrease. Death fourth day.	
2	F. 55	August, 1893 (Coley)	Recurrent carcinoma of breast	Erysipelas by inoculation.	Developed acute pleurisy. Death sixth day.	
3	M. 48	September, 1893 (Coley)	Enormous sarcoma of femur and pelvis.	Erysipelas by inoculation.	Slight decrease in size; temporary.	Died two months later; autopsy showed abdomen filled with pus.
4	F. 38	January, 1894 (Coley)	Cancer, "en cuirasse," advanced stage.	Three severe attacks of accidental erysipelas during 3 months.	Slight breaking down of a few nodules and rapid healing of ulcerated areas.	No decided check upon progress of disease.
5	F. 32	April, 1893 (Coley)	Very large sarcoma of thigh and pelvis (round celled).	Accidental erysipelas, mild attack.	Slight temporary improvement.	Rapid growth thereafter.
6	M. 63	July, 1893 (Dandridge)	Carcinoma of neck 3 x 4 in. 3 in. elevation.	Accidental erysipelas, ten days' course.	Tumor decreased one-half in ten days.	Remained stationary awhile then began to grow.
7	F.	(Wyeth)	Inoperable sarcoma of abdominal wall.	Accidental phlegmonous erysipelas.	Entire disappearance	Well seven years after.
8	F.	April, 1894 (Westbrook)	Recurrent carcinoma of breast	Accidental erysipelas, mild attack, five days.	Free breaking down and discharge first three days.	No permanent effect on tumor

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REVIEWS.

LES MALADIES DU SOLDAT. ETUDE ÉTIOLOGIQUE, ÉPIDÉMIOLOGIQUE, CLINIQUE ET PROPHYLACTIQUE. Par A. MARVAUD. Paris: Félix Alcan, éditeur, 1894.

THE DISEASES OF THE SOLDIER. By A. MARVAUD.

THIS work is worthy of more than a passing note, inasmuch as it is the first attempt at a systematic presentation of the diseases that prevail among soldiers in garrison in times of peace. Many important works have been published on the diseases that are prone to affect armies in active campaign, and many valuable articles have appeared on individual diseases as seen in the routine practice of military medicine in garrisons; but until now we have had no volume claiming to be a systematic treatise on the diseases of the soldier. Additional importance is given to this work by its semi-official character. Its author is entitled to speak *ex cathedrâ* as professor of military medicine in the Val de Grâce Medical School, and his statistics of disease and death are drawn from the official records of the Department of War. His matter is arranged under five heads: 1. The medical statistics of the French army and their comparison with the rates of other European services, and as far as possible with those of the civil population. 2. Infectious diseases. 3. General diseases, non-infectious. 4. Local diseases. 5. Diseases accidentally present, such as alcoholism and venereal diseases.

The attention of our army medical officers would probably be attracted by the statistics of this work rather than by the pathogeny, clinical characters, and prophylaxis which it presents, for the statistical data suggest comparisons at every turn, while the discussion of the other points is interesting only when illustrated by some army medical record. Yet these statistics are rarely susceptible of direct comparison with those of our army, on account of their failure to embody the lighter cases of disease. Sick men in the French military service are treated in quarters, in regimental hospitals, and in general hospitals; but the men treated in quarters are not taken up in the published record of sickness. The mean annual sick-rate of the French army is from 400 to 600, treated in hospitals, per thousand of effective; *our* annual rate is about 1300. Hence, according to the records, we have a morbility more than double that of the French army. Last year our rate was 1270, but this included every man who was excused from even a part of his military duty on account of sickness. Incidentally, we learn that in 1889 the number of men excused from duty in the French army was 1375 per thousand of strength, so that if the lighter cases treated in quarters became with them as with us a matter of record, our sick-rate would bear favorable comparison with that of the French troops.

During the period 1862–90 the mortality rate of the French army on home service fell from 9 to 6 per thousand of strength present. The rate of the German army is 3.9. In making this comparison our author is not slow to point out that a death-rate may be kept low by discharging from service on account of disability those whose cases will probably have a fatal ending, and that the death-rate should never be considered *per se*, but always in connection with its complement—the rate of discharge for sickness. Thus regarded, the annual loss of the French is 27 per thousand men, deaths 6, discharges 21, and of the German army 32.9, deaths 3.9, discharges 29. Incidentally, we may remark that in the United States army last year we had a loss of 24.79, deaths 6.44, discharges 18.35. This last statistical item is not gathered from Professor Marvaud's work, but from the Annual Report of the Surgeon General of the United States Army. When we remember that the French have a home-service army of 500,000 men, and that 110 of their military posts are garrisoned each by more than 10,000 men, we can easily understand why the statistics of the United States army of 25,000 men make no figure in the Professor's volume.

In discussing etiology, clinical features, etc., too much space, we consider, has been given to the theories and opinions of previous writers, mostly French authors, on the subject under discussion. Too much space is given also to the development of views that belong to the realm of general medicine, and concerning which the reader, whether a young military surgeon or a civilian confrère, should have been credited with as full a knowledge as may be gathered from our author's pages. Nevertheless the work presents many points of interest, some of which are indicated in the following paragraphs.

Typhoid fever is represented as the most frequent and important of the infectious diseases that prevail in the French army. There is, however, no certainty as to the extent of its prevalence. Prior to 1888 typhoid fever and continued fever were reported separately—about 10 cases annually of the former per thousand of strength, and 20 of the latter. In that year, owing to a growing belief at headquarters in the identity of the morbific action in these cases, the term continued fever was expunged from the record; but the regimental medical officers do not appear to have accepted the doctrine implied in the change, for instead of an increase to 30 per thousand in the typhoid rate, this rate remained at from 10 to 13, while a large increase took place in the diseases reported as "other general diseases." As the deaths from typhoid fever can be identified, the rate of 3 per thousand of strength may be accepted as accurate; but with only 10 cases per thousand, the rate of fatality of the disease is manifestly excessive. Marvaud considers that if all the light cases formerly reported as continued fever and now as other general diseases were reported as typhoid, the disease would be about 16 per cent. fatal. Fatal cases are of more frequent occurrence in Africa than at the home stations, the annual death-rate in the latter being 1.8 per thousand; and as the statistics of the Minister of the Interior show a death-rate from this disease of only 0.72 among young men of the military age in civil life, the soldier is considered to run a correspondingly high risk. As a rule, the mortality is greater the larger the aggregation of men in garrison, military posts of over 10,000 men having larger rates than those of smaller effective; nor can these differences be ascribed to climate or altitude or medical topography. In fact our author con-

cludes that there are no soils favorable or unfavorable to the development of typhoid fever; but he considers that season has much to do with its prevalence, as its curve rises to a maximum in October in Algeria and Tunis as in France, and the curve of mortality follows the same course. In some localized epidemics the typhoid sick-rate has been as high as 100 per thousand, as at Nancy in 1875; at Satory, 180; at Brest, 250; and at Dinan, in 1889, 600 per thousand. When an epidemic is localized in a small garrison the mortality is sometimes high, whereas when a large garrison is affected only certain of the barracks become infected, and in comparing the number of attacks and deaths with the total military population the gravity appears less on account of the large number of individuals belonging to that population.

It is noted also that in some localities where typhoid fever is endemic there are barracks that are notorious for always being more affected than others. This is attributed to a morbific influence inherent in the barracks, or to pathogenic conditions in the quarter of the town in which it is situated, as at Paris, Lyons, and Nancy. At other times, notwithstanding the most careful research, nothing is discovered to account for the presence of the disease in a limited part of a garrison, as in 1890, in the third squadron of the Fifth Cuirassiers, while the other squadrons of the regiment, and other regiments quartered in the vicinity, all under the same hygienic conditions, were free from the disease. Importation by troops from an infected locality has, of course, been frequently observed.

Baudin considered paludal and typhoid fevers as antagonistic, and that there could, therefore, be few cases of the latter in Africa. In view of this doctrine all low fevers occurring in Algeria were for many years called malarial remittents. L. Laveran was the first to recognize the presence of typhoid fever among these cases; and now this fever is acknowledged to be the most common and deadly of the Algerian diseases.

In 1877 Colin attributed the occurrence of typhoid fever to a number of insanitary conditions, and particularly to non-specific miasms. He considered the part played by water in its propagation as a secondary one, consisting simply in the production of a determination of the morbid cause toward the intestinal canal. Shortly after this publication, however, the medical officers of the French army had their attention directed to the water-supply by some notable occurrences. An epidemic in the garrison of Arnane ceased when certain wells became dry, and eight days after a return to the use of the well-water, replenished meanwhile by rains, cases of fever began again to appear. Not long thereafter the discovery of the Eberth-Gaffky bacillus gave to water its present prominent place as a propagator of typhoid fever. The development of the fever from the bacillus coli communis by its transformation into a variety of that of Eberth is also suggested. Of seventy epidemics reported as having occurred during the period 1883–89, thirty-nine were regarded as due to the ingestion of contaminated water. It was therefore decided to introduce the Chamberland filter where the water was of doubtful quality. This has been followed by a marked diminution in the prevalence of the fever; 6881 cases were reported in 1887, 4412 in 1889, 3491 in 1890, and 3225 in 1891. Although the part taken by water in the propagation of typhoid fever has thus officially and beneficially been recognized, army experience is regarded as giving full warrant to assigning a certain part in causation to soil, air, and even to contagion. The influences

which augment the receptivity of the soldier as regards this fever are discussed under the headings: age, exposure of young countrymen to urban insanitary influences, overcrowding, and exhaustion.

The author diagnosticates his typho-malarial cases by a thermometric record taken every two hours, which he claims shows a double febrile action culminating in the morning for the paludal poison and in the evening for the typhoid factor. To sum up his views on this subject he cites Gancel in terms somewhat as follows: 1. Paludism may be associated with typhoid fever. In certain cases it precedes the dothienenteritis; in others it appears simultaneously or becomes revealed in the course of the malady; at other times again it is declared only during the period of convalescence. 2. From this morbid association a special malady results, having its clinical and thermal characters varying with the proportion in which its two pathogenic factors occur in the case. 3. In the absence of regular or pernicious accessions the malarial influence is revealed by an alteration of the thermic type of the enteric fever and explains the hybrid and atypical forms of this affection. 4. The mixed nature of the typho-malarial fever is proved by its symptoms and pathological anatomy. This is the view of typho-malarial fever which we in the United States have taken since the analysis of the typho-malarial cases of the Civil War; and happily the ambiguous term itself has now nearly died out. A malarial remittent is with us a malarial remittent, although it may be adynamic in type, and a case of typhoid fever is reported as such, although it may be complicated with malarial manifestations.

Greater importance is attached by Professor Marvaud to the hygienic than to the medical treatment of typhoid fever. These febrile cases are treated usually in the largest and best-ventilated wards, and each patient has two beds side by side, a provision which prevents overcrowding and facilitates the employment of applications to the person. The strength is supported by beef-tea, milk, café alcoolisé, and generous wines; refreshing drinks, chiefly lemonade, are found to allay the distressing thirst and to promote the elimination of toxic principles (leucomaines) by diuresis; acid gargles are also employed and compresses wrung out of cold water and frequently changed are applied to the abdomen to promote intestinal contraction and prevent the retention of gaseous and fecal matters. Refrigerant and sedative lotions are used for the reduction of temperature and to allay disturbance of the nervous system. When the axillary temperature passes 39° C. (102.2° F.) sponging with carbolized vinegar as often as six times a day lowers the temperature from 0.5° to 1.5° C., allays nocturnal agitation and delirium, and promotes the cutaneous functions. These spongings are considered much preferable to baths. In the way of medication are given laxatives and purgatives in constipation, bismuth and opium in diarrhœa, when one or other of these conditions occasion danger by its persistence; for thoracic complications revulsives, as tincture of iodine and blisters, with expectorants as tolu; for nervous agitation and insomnia chloral and bromide of potassium. Quinine has been disused as unsatisfactory, for while influencing the fever but slightly, it aggravated the nervous symptoms, increasing headache, stupor, and adyamia, favoring collapse, compromising the case, and retarding convalescence. The internal administration of antiseptics was also discarded, as, notwithstanding all efforts in this direction, none has been discovered that is capable of arresting or mod-

erating in the living tissues the pathogenic power of the infectious element. Prophylaxis may be inferred from what has already been said of the etiology of the disease. The abandonment of an infected camp or barrack has become classic in military prophylaxy, as it arrests the progress of the local infection, preserves individuals who have not yet become invaded by the typhogenic germs, and permits of the necessary disinfection of the quarters.

Pulmonary consumption takes second place in importance. The death-rate from this disease is greater among old than among young soldiers; but our author claims that we would be wrong in attributing this to a harmful influence exercised on the constitution of the men by the fatigues and exigencies of military life. It is due to the fact that young consumptives are discharged from the army, but old soldiers who become affected dislike to be returned to civil life and are permitted to remain and die in the military hospitals. The mean number of cases originating in the army is four per thousand of strength, of which one is fatal in the service and three are discharged. The death-rate from phthisis is greater in the army by 150 per cent. than in the civil population of corresponding sex and age. The disease is prone to attack soldiers in their first year of service, comporting itself in this respect like all the other infectious and specific diseases. The proportion of consumptives in the army varies with the arm of the service—greatest in the infantry and least in the zouaves. The principal influence which makes itself felt in the partition of consumption among the various arms depends on the requirements for enlistment and the care exercised in the selection of the men. The experience of Professor Marvaud confirms the observations of many authors cited as to the existence of an antagonism between consumption and typhoid fever. Of the many autopsies he has made during typhoid epidemics in garrison he has never observed tubercles in the lungs or other organs, and has never seen a consumptive contract typhoid fever even when treated in a ward with typhoid cases. But he cannot similarly confirm Boudin's doctrine of antagonism to paludism.

Prophylaxis consists of: 1. The immediate discharge from service of all men affected with tuberculosis or likely to become so, such as those having weakly constitutions, vicious conformation of the chest, insufficient respiratory capacity, or hereditary tendencies. 2. The discharge as promptly as possible of all who become affected during service. 3. Preventive hygienic measures; location of barracks away from towns and on elevated and well-ventilated sites; thorough ventilation of squad-rooms, and day rooms for the use of the soldiers in inclement weather; antiseptics in spittoons and paraffined floors to prevent soiling with sputa; the disuse for a certain period of any squad room in which cases have been developed; isolation wards; disinfection; attention to diet; the avoidance of sudden transitions from heat to cold; and the use of such exercises in the open air as tend to expand the chest.

Vaccination has been in use in the French army since 1831, and re-vaccination since 1857. In 1866 an effort was made to substitute animal virus for the arm-to arm method, up to that time in use, but the experimental results were unsatisfactory, and it was not until 1889 that animal vaccine received official recognition. The army now raises its own supply of animal vaccine.

The chapter on cerebro-spinal meningitis is unsatisfactory save as to

its statistics. Etiology unknown, prophylaxis correspondingly uncertain, and treatment unhappily but little efficacious.

Diphtheria is the only specific febrile and infectious disease that has been increasing in prevalence of late years in the army. Its occurrence as a complication of other maladies is accounted for by the existence in the mouths of persons who have never had diphtheria and who have not been in contact with diphtheritic cases of a bacillus, Löffler's pseudo-diphtheriticus, which would be harmless in a healthy organism, but which assumes pathogenic properties when the individual comes under the influence of pathological conditions. Little is said of differentiating these cases from other forms of sore-throat. Detersive applications are recommended, as of borax, chlorate of potash, nitrate of silver, lemon-juice, tincture of iodine, and perchloride of iron.

Jaundice is the next subject discussed—not the jaundice due to retention of bile, as from calculi, tumors, gastro-duodenitis, etc., nor that resulting from alterations in the hepatic parenchyma attributed to compression of the biliary ducts by the congested vessels, nor those cases due to alterations in the blood by the infectious agents of malarial and typhoid fevers, etc.; but a general disease of an infectious nature, the invariable lesion of which is acute yellow atrophy. No light is thrown on the obscurity of this disease.

As goitre occurs among soldiers only when stationed in localities where it is endemic, the disease is attributed to influences common to the soldier and the civil population. The infectious cause is assumed to be of a microbic nature and propagated in the water-supply.

The regulations of the French army in regard to the management of cases of glanders are cited in full. The proportion of deaths from bites of rabid animals is said to have fall from 16 to 0.25 per cent. since 1886, when facilities were provided at the Val de Grâce Hospital for special treatment by Pasteur's method.

Paludism and diarrhœa and dysentery are discussed as infectious diseases prevalent in Algeria and Tunis. If our author gives expression to the views held generally by the French army medical officers, we must regard these officers as seriously at fault in respect to the propagation of malarial diseases. The opinions of Colin, last published formally in 1872, to the effect that the malarial germ enters the system by the pulmonary tract, and that it is doubtful whether the absorption of this germ can be effected by the digestive system when introduced by the drinking-water, are cited as current doctrine, although medical experience in those parts of this country and India where malarial diseases are most prevalent, has established a firm belief in their propagation by water-supplies, and practical sanitarians operating on this line have given a new reputation to localities formerly notorious for their insalubrity.

Two views are given of the causation of dysentery: that of Colin, which regards the disease as a simple inflammation of the large intestine produced by food or water of bad quality, by foul emanations, or by chilling of the surface; and that of Kelsch, which attributes it to a specific microbe. The latter view is approved by Professor Marvaud on account of the discovery of a special microbe in the stools by Chantemesse and Widal, and in consideration of instances of its importation into barracks in good sanitary condition, of its development in hospitals from the presence of affected persons, and of its propagation to the civil populations of cities and towns from contact with an affected army.

Our author's conclusions as to la grippe are those of Antony, published in 1890. The contagious character of the pandemic is proved by the coincidence of its appearance in a locality with the arrival of someone from an infected place, by the immunity of isolated persons, and by the special incidence of the disease on the men of the hospital corps as compared with those serving in other corps. The results of the study of the recent pandemic do not seem to have been before Professor Marvaud when his chapter on this disease was written.

As to cholera, we are surprised to find that the regulations in force in the French army are those of July 20, 1883, *i. e.*, of a date prior to the discovery of the cholera spirillum. The French authorities have not as yet given the bacillus of the distinguished German bacteriologist an official recognition.

Rheumatism is the only one of the other general maladies that is considered of special interest to the army medical officer, but we find in its discussion little of interest. Of 600 cases 20 have cardiac complications, necessitating discharge.

Local diseases are arranged under the headings of the various organic systems. Pneumonia is included among those of the respiratory system; but our author recognizes the specific and microbic character of the disease as developed by Jürgensen, Klebs, Eberth, Koch, Talamon, Fränkel, and Netter. Much of the heart disease among French troops is considered due to the rapidity and consequent want of care with which the examination of conscripts is made. Nostalgia is said to have disappeared from the army since the term of service was reduced to three years and special measures taken to provide recreation for the men in garrison. Skin diseases have the high rate of twenty-four per thousand of strength, and three or four of these are cases of scabies. Most of the cases of disease of the ear are said to have originated before enlistment. Cases are noted of otitis media from the introduction of cold water into the ear during bathing, as also cases of deafness from inspissated cerumen.

Venereal diseases have undergone a considerable diminution in their prevalence of late years. During 1862–69 the rate per thousand of strength was 106; 1872–79, 74; in 1880–88, 55; and in 1889–90, 45. These statistics, says our author, tend to place the army on the same line as the troops of Austro-Hungary and Prussia, which are in Europe those least affected with these diseases. He refers to the propagation of syphilis during the operation for tattooing from the use of a needle infected either by the saliva of the operator or by the blood of one who had been operated on previously. No special measure is in force for the suppression of venereal diseases; but the army is benefited by the sanitary police rules relating to the examination of prostitutes and the repression of clandestine prostitution applied in garrison towns for the prevention of the spread of the disease in the civil population. At one time a month's imprisonment was imposed on every venereal case after discharge from the hospital, but as this led the men to conceal their affection from their medical officers and place themselves for treatment in the hands of empirics, the order imposing the punishment was revoked.

AN OUTLINE OF THE EMBRYOLOGY OF THE EYE; WITH ILLUSTRATIONS FROM ORIGINAL PEN-DRAWINGS BY THE AUTHOR. By WARD A. HOLDEN, A.M., M.D., Assistant Surgeon, New York Ophthalmic and Aural Institute; Clinical Assistant, Vanderbilt Clinic. The Cartwright Prize Essay for 1893. Small 8vo., pp. 69. New York and London: G. P. Putnam's Sons.

THIS brochure is conveniently divided into two parts. The first consists of a brief and purely schematic sketch of the most important processes that occur during the ontogenetic history of the organ, and the second embraces an accurate description of the histological appearances of the various portions of the organ as seen during their successive phases of development. The former has been made quite easy of comprehension by the introduction of several explanatory diagrams, whilst the latter has been adequately elucidated by a series of careful drawings made from actual preparations in the author's possession.

As such a work as this can only be judged by careful perusal of every contained point, which must be compared and contrasted with the work and the views of others upon the same subjects, the task, although pleasant and profitable, becomes both difficult and at times, upon account of inability of sequential observation, uncertain.

Gauged from such a standpoint, we first reach his most excellent description of the evolution of the cornea. In this section he does not pretend to find the origin of the endothelial cells forming the endothelial layer of the membrane. He considers Descemet's membrane as a product of the endothelium, this belief being strengthened, as he says, by Wagenmann's studies with the human eye, where this author found that a similar elastic membrane is developed when the endothelial layer is displaced.

The facts that in mammals the cells of the corneal stroma lie directly against the superimposed epithelium, and that later a fibrous layer similar to that which is found in the deeper-lying corneal tissue, is the first here to appear, give the author sufficient support in believing that Bowman's membrane is simply an early product of the corneal cells themselves. He further thinks that the homogeneous material of the cornea "is in all probability simply an indifferent fluid filling a cavity."

To him, the capsular membrane of the lens sac is of cuticular formation of the epithelial cells. Curiously, and possibly wisely, he fails to make any specific mention of the so-called lens "stars," or lines of apposition of the terminals of the lenticular fibres.

Section 8, descriptive of the iris, ciliary body, and pupillary membrane, is one of the best in the book. Here, in speaking of coloboma iridis, he says that the fibrous cord running forward in the vitreous from the optic-nerve head to the posterior pole of the lens and then meridionally to the lenticular equator at which point it is inserted into the ciliary body at the head of the coloboma, as described by Hess, is merely a remnant of the fœtal vessels left because of the failure of the development of the secondary vesicle at some anterior point, thus allowing the preservation of the posterior lens sheath vessels to extend over the anterior margin of the vesicle wall to reach the mesoblastic tissue outside: in short, as he says, "the persistent cord is not the cause of the coloboma of the iris, but the consequence."

The common view that at first the retinal vessels constitute merely a system of the vitreous vessels, he disproves by the fact that the two series are always separated from one another by the limitans interna. Beyond the mere division of the vitreous into apparent lamellæ along these vascular systems, he distinctly denies the existence of any demonstrable structural elements that might produce stratification.

He is very emphatic in his opinion that the large, pale, round cells with nuclei and processes in the optic nerve are frequently confounded with the branched and spindle shaped mesoblastic cells that form the sheath of the nerve, and that the former must be considered as the epiblastic cells of the optic nerve.

It seems a pity that whilst discussing the points of appearance of the orbicularis muscle in the middle structure of the palpebral mesoderm, he did not endeavor to trace its origin, which according to some is in the blastema of the muscular segments found at the upper part of the embryonic neck. It would also have been interesting and made the study more complete, if the origin and development of the extrinsic or so-called orbital muscles of the eyeball from the cephalic myotomes had been outlined. Especially could this have been logically done, as he properly tells us (a statement with which most practical embryologists are in accord) that he has made use of the findings in comparative anatomy: so here, as is well known, the lower vertebrates have their muscle-plates better developed, the results of Miss Platt's studies upon the cephalic myotomes of the Acanthias vulgaris might have been advantageously added.

Judged both from a practical and a scientific standpoint, the work—as it truly is, as it represents much conscientious labor—can be commended not only as a safe guide and a trustworthy teacher to the uninformed student, but offers itself as a delightful companion for careful perusal by the best informed and most profound embryologist. Bold at times in its denials, yet never without reason; offering sound judgment and best of common sense in the least certain of its guessings; and never too dogmatic in individual opinion nor forgetful of others' work in the same direction: too much praise cannot be given to the author for an honest endeavor to advance and popularize the more certain and the more accurate knowledge of the embryology of the eye.

The work is worthy of its entire purpose and should have many readers. C. A. O.

A System of Genito-urinary Diseases, Syphilology, and Dermatology. Edited by Prince A. Morrow, A.M., M.D. Volume II. New York: D. Appleton & Co., 1894.

This work is fully abreast of the times, embracing all the recent advances made in this department of medicine, and gives the experience of some of the best specialists.

Dr. James Nevins Hyde contributes a valuable treatise on the "History, Geographical Distribution, Evolution, and General Pathological Anatomy of Syphilis." It is very readable and interesting; full of useful information, told in a concise and entertaining manner.

In the article on the "Etiology of Syphilis," Dr. Fordyce has ably

set forth all that is known relating to the theory of the bacterial origin of the disease, as well as of the action of toxines upon the tissues of the body and the part played by the pyogenic microbes in causing well-known pathological changes so frequently found in connection with venereal disorders.

The whole is a valuable *résumé* of the subject. Whilst the author is unable to prove that syphilis is due to a specific micro-organism, he leaves in the mind of the reader but little doubt of the truth of this postulate, and shows that many manifestations of this affection can only be explained on this hypothesis. It is singular that whilst considering the bacteriological aspect of this disease nothing is said about the antagonism which seems to exist between the streptococcus of erysipelas and syphilis; this subject receives passing notice in another portion of the work.

One of the most important, practical, and valuable chapters to the general practitioner is that contributed by Dr. Prince A. Morrow on "Syphiloderma." Symptomology, varieties in type, unusual modes of evolution, morbid anatomy, and classification are taken up in turn and exhaustively treated. The wisdom of choosing Cazenave's classification of the syphilides, dividing the eruptions into the erythematous, papular, pustular, and tubercular forms, to which has been added a fifth division relating to anomalies in pigmentation and hemorrhagic effusions, becomes at once apparent on reading the article. The adoption of this arrangement renders the subject extremely simple and easy to understand. The general practitioner will be greatly aided by following this classification and will readily assign the eruption to the class to which it belongs.

The advantage of the arrangement of Dr. Morrow over those proposed by Hardy, Mauriac, Zeissl, Leloir, Willan, and others is too apparent to need more than a passing notice.

The article is well and instructively illustrated. Dr. Morrow is to be congratulated upon the successful production of Plates Nos. 3, 4, 6, and 12 by means of photography and lithography, "being the first time," as stated in the preface, "that this method has been applied to medical subjects."

This chapter is followed by valuable contributions by many of the best-known authors on subjects embracing special portions and organs of the body. It is needless to say that they are well written, are full of information, and represent the views of the leading syphilographers.

The very important section on the "Treatment of Syphilis" is written by Dr. J. William White. The article is full and complete.

The routine method of treatment advised is what is known as the "systematic course," which is the uninterrupted administration of mercury for the space of two years; first giving the remedy *per orem* for three months, then making use of mercurial inunctions for two weeks, returning to the internal use of the drug, and thus alternating until the period named has expired. After this the patient is to be placed upon the use of iodide of potassium. In very mild cases we have had perfect cures follow the interrupted method. The systematic course of treatment we have always reserved for more severe cases, believing that the larger the amount of the poison received into the system the more active should be our efforts to combat it.

A full review of the literature of the hypodermatic method of medication is given. Dr. White agrees with most English and American

authorities in condemning this form of treatment as a routine method of practice. The great objection urged against it is that relapses occur in a large percentage of patients thus treated, an adoption of some other method being necessary for the permanent cure of the disease. Dr. White has placed the literature of the subject fully and fairly before his readers. The conditions under which he recommends the employment of the hypodermatic medication may be summarized as follows:

"(*a*) Those cases in which other methods of treatment have been tried and failed. (*b*) Those cases in which, owing to idiosyncrasy or intercurrent disease of the skin, the digestive tract cannot be used for the introduction of mercury. (*c*) Those cases in which, owing to grave and advancing lesions, rapid mercurialization is absolutely necessary. (*d*) Those cases in which obstinate local lesions can be most directly reached by this plan. (*e*) Possibly those cases in which early differentiation between syphilis and malignant disease, or tubercular ulceration, is extremely important."

The hypodermatic method, in suitable cases, is one of the strongest weapons that the physician possesses wherewith to fight this disease; it finds its uses in those instances in which a rapid impression is needed, as, for example, when the eruption appears on the face; in married men; or when some vital structure is involved. The results are almost magical. It may likewise be employed as a substitute for inunctions when employing the systematic method of treatment, in relapsing or malignant syphilis, or in those obstinate cases which do not yield to other means of treatment.

We have administered many hundreds of hypodermatic injections of corrosive sublimate solution and of the gray oil; in no one instance has there been any complaint of pain. We have never seen an abscess follow their employment; it is true, however, that the gray oil will produce an induration which disappears in from two to four weeks; in two instances slight ptyalism followed its use.

Dr. White earnestly calls the attention of the profession to the importance of looking after the hygienic condition of the mouth of the patient; insisting that the gums and teeth should be kept in the best possible condition; that the physician should examine the quantity and quality of the saliva; and be on the alert to observe if there exist a feeling as if the teeth were elongated, or if there be a sensation of tenderness produced when they are brought into sharp contact. These symptoms should warn the medical attendant that the limit for the use of mercury has been reached. Griping and diarrhœa are of secondary importance.

The use of opium combined with mercury is strongly condemned, on the ground that it masks the effect of that drug and permits its accumulation in the system, producing ptyalism when least expected, beside laying the patient liable to contract the opium habit. The employment of ipecac or of tartar emetic is not approved.

Then follows an excellent article by Dr. Samuel Treat Armstrong on "Syphilis in Relation to Public Health," in which the author calls attention in a forcible manner to the failure of legislation to prevent the spread of the disease. He offers some practical and available suggestions, which if adopted would doubtless be of benefit to the general public.

The concluding articles are from the pens of Dr. Edward Martin and Dr. James P. Tuttle; the first is upon the subject of "Chancroid," and the second, that of Dr. Tuttle, on "Chancroid of the Anus and Rectum."

We take exception to the views of Dr. Martin, page 883, when referring to the operation of circumcision complicating chancroids. He says: "The foreskin should be split up along the dorsum. The objection to circumcision under these circumstances depends on the fact that the wound is frequently inoculated with the chancroidal virus and will become converted into a circular chancroid."

The objection to the method recommended by Dr. Martin, and indeed advised by many writers, is that it leaves two unsightly flaps, the shape of a dog's ear, on each side of the penis. If, immediately after the removal of the prepuce the operator will douche the part with 1 : 1000 corrosive sublimate solution, and touch the sores with pure carbolic acid, there is but little more danger of infection from circumcision than from splitting the foreskin.

Of seventeen operations of this description performed by us in the past five months, all recovered within a few days without any trouble, with the exception of two, which were slightly infected at the lower portion of the wound. We have on several occasions had to perform a secondary operation to remove unsightly flaps remaining after splitting the foreskin.

The illustrations and print of the work could not be improved. The book is full of valuable information, embodying the latest views of well-known teachers and writers; it will no doubt meet with what it richly deserves, a cordial reception from the profession. O. H.

HANDBOOK OF PUBLIC HEALTH AND DEMOGRAPHY. By EDWARD F. WILLOUGHBY, M.D. Pp. 509. London and New York: Macmillan & Co., 1893.

THIS little book is a very welcome and valuable addition to the literature of hygiene, containing, as it does, a vast deal of useful information imparted without useless verbiage and in a most pleasing style. It is in most refreshing contrast with many of the more recent works which are but deserts of words with only occasional oases of ideas.

Chapter I., on the "Health of the Man," deals first with dietetics, treats in an interesting manner of the albuminates, fats, and carbohydrates; discusses the purposes served by food, the quantity of each of the food stuffs required, and the effects of an excess or undue preponderance of one or the other of the food stuffs. The composition of the principal articles of food is given, with much relevant information of an instructive character. Under "Ale, Beer, and Stout" the statement that Bavarian beer "is the mildest, containing but 2 per cent. of alcohol," is presumably a misprint, the lowest percentage of alcohol in Bavarian beer in the table following being 3.80.

The use and abuse of alcohol is discussed somewhat briefly, but in an absolutely fair and sensible manner, quite unlike that affected by those who write on this subject with sidelong glances at the various temperance unions, whose anticipated disapproval of the real truth has been responsible for much nonsensical literature. The remarks on cooking are rich in information of a practical value.

Adulteration of food is treated of in an interesting manner, and much information is given in a few pages. Complicated processes of analysis are omitted, the reader being referred to special works on food analysis, but methods, mostly qualitative and easily applied, are given for the detection of many of the adulterations of common occurrence.

The articles on clothing, bedding, baths and bathing, are particularly good and entertaining.

Chapter II. is on "Health of the House." Section I., on Air, Warmth, and Light is admirable, particularly that portion devoted to heating. Air analysis is not well given, but the author states that detailed descriptions of quantitative chemical analysis do not come within the scope of the book.

Section II., on "General Sanitary Arrangements," is up to the standard of general excellence.

Chapter III., on "Health of the City," is devoted to the consideration of water-supply, disposal of refuse and excreta, river pollution, and disposal of the dead. Though in some respects the sections on water-supply and river pollution are hardly up to date, they are far in advance of most of the writings on these subjects by English authors. The section on disposal of the dead is most sensible.

Chapter IV., on "Health of the People," discusses preventable diseases, vaccination, disinfection, and school and industrial hygiene. The deficiencies observed under disinfectants are more than compensated for by the admirable handling of vaccination. The sections on school and industrial hygiene are well worthy of careful perusal.

Chapter V., on "Demography," points out many fallacies in making tables of vital statistics. The remarks on the comparative mortality of various trades and professions are particularly sensible, and show the utter ridiculousness of many of the deductions drawn by our statisticians.

Chapter VI., on "Meteorology," is full of facts well illustrated by examples.

Chapter VII. is an enumeration of the many English acts and provisions relating to the public health.

An appendix contains tables of English and metrical weights and measures and analytical tables of the more important articles of food.

To speak in detail of the many good points of this book would involve so much quotation as to necessitate the reprinting of nearly the whole work. Those who are well informed in hygiene will find much pleasure and profit in reading this book, and those who are not ought to be obliged to study it. C. H.

THE BLOT UPON THE BRAIN: STUDIES IN HISTORY AND PSYCHOLOGY. By WILLIAM W. IRELAND, M.D. Edin., etc. Second edition. New York: G. P. Putnam's Sons. Edinburgh: Bell & Bradfute, 1893.

IT has been said, wisely, that history is philosophy teaching by example. This book by Dr. Ireland may be said to be a contribution to history as a science teaching by experience. In it are contained some at least of the most glaring of the many illustrations which science may gather from the open page of history of the perversion of States, of creeds, and even of civilizations, by the blotted brains of imbeciles, of

fanatics, and of paranoiacs. The book, in this sense, is a notable contribution to the science of sociology; and presenting as it does its material in brief dramatic narratives, and in a crisp and attractive style, it has the advantage of elucidating with clearness and force some of the most abstruse psychical problems which have complicated the political and historical drama of all epochs and nations. The book for us has a profound depth of meaning, as illustrating both the degradation of States and the growth of stupendous religious delusions under the influence of the half-crazed or wholly debauched minds of prophets, priests, and kings. From our special standpoint, too, it is gratifying as the work of a physician, as illustrating the capacity of a scholar trained in the sciences of medicine and psychiatry to contribute, from out of the fulness of his special lore, to the benefit of some of the most recondite questions in the science of history. It is, indeed, a fine example of the doctor in politics.

Dr. Ireland's book, moreover, is in accord with the best modern spirit in its method of writing history. Not by act of council or parliament, nor even by the arbitration of great battles, is either the best or the worst of history made. This is now beginning to be recognized. It is the personal equation, or, according to the prophet Thomas Carlyle, the heroic element in man, that we must reckon with if we wish to rightly understand human history. But unfortunately there is an *unheroic* element in man, and this also has helped to make destiny on this earth, and of this element Carlyle and his school had little ken. This is the element which, with all its power for misrule, for tyranny, for absolutism, for superstition, for degrading states, for founding religions, from Tiberius to Mohammed, and Toghlak and Ivan the Terrible—this is the element which we find described in Dr. Ireland's book. It merits no acclaim from even the most deluded hero-worshipper, but only the cold dissecting criticism which Dr. Ireland admirably brings to the task.

The hereditary neurosis which the author, with some others, claims was seen in the family of the Cæsars is described with rather too little of detail. The narrative evidently is taken largely from the pages of Tacitus and of Suetonius, with which studious readers are already familiar. The "insanity of power" is perhaps a new morbid entity which must be reserved for usurpers and for absolute monarchs. In the Cæsars it was conspicuously the fruit of the intoxication which came from the abuse of an imperial power such as never before descended, and it is to be hoped will never again descend, upon mortal man. The world is perhaps not yet done with this psychosis, and some evidence of it may be seen in Europe at the present day, but the world does not read the lessons of history and science aright if it does not find in time a preventive, or at least a cure. With the common run this form of degeneracy can be diagnosticated; with tyrants it must be eradicated.

The strange alliance of despotism, lust, and religious devotion is illustrated by several striking examples in this book. It is a well-known syndrome in some forms of degeneracy and insanity. Its influence in history has perhaps not been sufficiently recognized. This association of sexual and religious perversions is the most disgusting anomaly of the insane brain. The mad wretch, Ivan IV. of Russia, who married seven wives and despoiled women without number, who killed 27,000 people at the sack of Novgorod, who slew his own son, and whose reign was one long debauch of power, lust, and blood, wrote piously that he wanted

only the grace of God and of the Holy Virgin Mary, and did not desire the approval of men. He was familiar with Scripture, and combated heresy like a monk. Toghlak was a somewhat similar zealot of Mohammedanism; and the Catholic king Louis XV. of France, went to prayers with a group of favorites from his *parc aux cerfs*. The alliance, still more fatal to human happiness, of religion with despotism, of priestcraft and intolerance with the mad excesses of kings and ministers, has its illustrations, and its lessons, too, in this book. Those who court a return to mediævalism, and, in this age of science, champion dogmas whose history is written in blood, may well read and ponder.

Dr. Ireland gives us a fine sketch of St. Francis Xavier and his mission to the Indies. Why the saint is classed among those who have a blot upon their brains, the author does not expressly state, and some readers doubtless will wonder. We, however, venture to think that the classification is a just one, and that Dr. Ireland, with his usual insight and powers of historical and psychological analysis, has indicated an important truth when he ranks Xavier and those like him with those who see visions and dream dreams. The sufficient vindication for this criticism lies perhaps in the fact that after three centuries all that Xavier and his followers, of all sects, have accomplished in propagandizing among the subtle and intellectual peoples of India, Japan, and China is conspicuously small. The apostle to the Indies, who attempted to introduce the Inquisition into Hindostan, was a strange compound of zeal and shrewdness, bigotry and humanity, self-denial and worldly policy. He had not the saving grace of common sense, and his defenders have not honored his memory by repeating the silly tale that his flesh after death was preserved sweet by a miracle.

The power of a fixed idea on the insane brain is familiar to all alienists, and also the rather more rare phenomenon of the power of contagion that lies in these imperative conceptions. Dr. Ireland turns naturally to the crusades for the best historical instances of the epidemic influence of such fixed ideas. This view of the crusades is the only rational and scientific one. They were the enterprises of a populace which lay under the spell of dark and dangerous delusions, in the squalor and ignorance of the middle ages, when orthodoxy, and not civilization, furnished the motives for the conduct of men. The dancing maniacs, with their manifestations of grand hysteria, were other phases of the same influence.

We cannot follow the author through all the pages of his intensely interesting and instructive book. The work is unique. It is quite original in conception, and very successfully wrought out. It occupies a legitimate field for the studies and the literary labors of scientists and of physicians, and we congratulate the author upon having so successfully shown the way. J. H. L.

THROMBOSIS OF THE LATERAL SINUS RESULTING FROM SUPPURATIVE MIDDLE-EAR DISEASE, AND ITS TREATMENT. Large 8vo., pp. x., 252. Berlin: A. Hirschwald, 1893.

FINLAND occasionally reminds us that even in distant parts of the world as well as in the great centres there is a literary and a practical surgical activity which produces results of value. It is to that far

neighbor of the Russian Empire that we owe the operation of Estlander, and now another colleague of his in the University of Helsingfors has given us the most complete brochure on sinus thrombosis which has yet been published.

The book consists of two parts, the first of which considers the history of thrombosis of the lateral sinus; then the anatomical relations; next the pathology of the formation of thrombi, especially in the cerebral sinuses, and more particularly the lateral and sigmoid sinuses. This is followed by the etiology, symptomatology, course and duration, diagnosis and differential diagnosis, prognosis, and treatment. This portion is closed by a critical view of the results of the operation and a copious bibliography.

The second part, which constitutes just half the book, consists of a *résumé* of cases, which is of great value, especially to those not having access to the literature. There are: (1) 60 cases of thrombosis of the lateral sinus without meningitis or abscess of the brain; (2) 26 cases of thrombosis of the sinus with meningitis; (3) 13 cases with brain abscess; (4) 14 cases with both meningitis and abscess of the brain; (5) 5 cases in which the complications were uncertain; and finally, and most important of all, a *résumé* of 25 cases in which the disorder has been treated by operation. His tables in the first part are numerous (twenty-eight) and are extremely instructive. They are based on the individual cases which are given in the second part, which seem to have been collated with great care and fidelity, though the list is very incomplete. Of the 25 cases operated on, 15 recovered and 10 died, a mortality of 40 per cent. The reviewer has, however, a list, including these 25 cases, of 74 cases in all, a few of which have been published since FORSELLES' brochure was printed, and could not, therefore, have been included in his tables. Of the 74 cases 49 recovered and 25 died, a mortality of little over one-third. When it is remembered how recently the operative treatment of this condition has been introduced—practically five years ago—this is a surprisingly good showing; and when it is remembered that without operative treatment practically every case would have proved fatal, the greatest possible encouragement can be drawn from these figures. It is strange that in America there has been, so far as we know, but a single case reported—that of the reviewer, in the *Times and Register* of December 20, 1890—and unfortunately this case was seen at so late a period that the result was hopeless, even from the start.

We beg to call the earnest attention of American physicians—especially of neurologists, otologists, and surgeons—to the urgent need for early and radical operation in this easily recognized condition.

Anyone who will consult this admirable monograph of Forselles, as well as Macewen's recent book on the *Pyogenic Infective Diseases of the Brain and Spinal Cord*, will find the symptomatology and treatment exhaustively considered. We hope to see before long a number of cases of successful treatment reported. W. W. K.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Properties of the Thyroid and the Spleen.

Dr. Frederick Gourlay concludes from his experiments, that (1) the thyroid does not contain nor yield any peptone or proteose. (2) Its secretion is not mucin, as it yields no reducing sugar on treatment with dilute mineral acid. (3) The only proteid that can be obtained in any quantity from it is a nucleo-albumin. (4) This is derived, at any rate partly, from the so-called colloid matter in the acini. (5) Experiments which had for their object the finding of a ferment in the thyroid, which dissolves mucin, led to negative results; and it is suggested, with all reserve, that the nucleo-albumin is the material to which the thyroid treatment of myxœdema owes its usefulness. (6) Thyroid nucleo-albumin causes intra-vascular coagulation. As regards the spleen: (1) Fresh spleen, like thyroid, is alkaline. (2) Fresh spleen contains neither peptone nor proteose. (3) The proteids which can be extracted from fresh spleen resemble those found in lymphoid structures. (4) The most important of these are a globulin and a nucleo-albumin. (5) The nucleo-albumin, like that similarly obtained from other cellular organs, produces, when injected into the circulation of rabbits, intra-vascular coagulation. —*The Journal of Physiology*, 1894, Nos. 1 and 2, p. 23.

Methylene-blue in Malaria.

Dr. Ernst Fratnich has made use of this remedy in four cases. In each the urine became markedly colored, its amount increased, yet it contained no albumin. As an unpleasant symptom the spasmodic bladder-irritation may arise, but this is controlled by as much powdered nutmeg as can be placed upon the point of a knife. In these cases this symptom was not noticed; the stools and the saliva were colored, but otherwise normal. The dose was about wo grains, given once daily. In three of the cases favorable results were obtained.—*Therapeutische Monatshefte*, 1894, Heft 4, S. 150.

The Anti-diphtherin of Klebs.

Dr. Oscar Vulpius applies the liquid with a long-handled camel's-hair brush, which is readily managed, first to the tonsils and soft palate, and, after thorough cleansing, to the pharynx. With restless children one must be content with imperfect treatment, and even with one application; even the liquid may be expelled by vomiting, before, indeed, it can reach the membrane. The results as noted include a marked subsidence of the fever; the membrane may remain entirely unchanged during the treatment, nor, indeed, does this treatment prevent the tendency of the process to invade the trachea and bronchial tubes, consequently it has no influence in preventing croup. However, as it is important that the remedy shall be brought into close contact with the diseased surface, it should be again applied as soon as the membrane is coughed up. In this series of cases, nineteen in number, the percentage of deaths was 52.6; omitting one case of the rare accident, late secondary hemorrhage after tracheotomy, the rate falls to 50 per cent. Whether with an improved anti-diphtherin, or with possibly a combination with this of a diplococcus poison, better results may be obtained, the future only will determine.—*Deutsche medicinische Wochenschrift*, 1894, No. 6, S. 127.

Inoculation in Diphtheria and Membranous Croup.

Dr. W. W. Myers prepares the substance for inoculation, which he designates as toxalbumin, as follows: The diphtheria bouillon-culture is first filtered, then evaporated to one-third its volume; it is then treated with ten times the quantity of alcohol and acetic acid, and precipitated until a clear liquid is obtained; this is dialyzed for seventy-two hours, and again precipitated with alcohol and dried; the residue is a white substance. The patient is treated by local applications of 4 per cent. solutions. Inoculations made from this substance in the arms of members of the same family resulted in some febrile manifestations, but they did not acquire diphtheria, although this disease has an undoubted tendency to propagate itself by contact from individual to individual.—*The American Therapist*, 1894, No. 8, p. 225.

The Treatment of Severe Influenza.

Dr. Juhel-Rénoy is a strong advocate of bathing, refrigeration, and alcoholic stimulation in the treatment of these cases. In the cases which are apparently, although not really, severe, small amounts of alcohol, abundant fluids, revulsion by mustard, or dry cupping. For the mild cases, antipyrine or salipyrine, in doses of from thirty to sixty grains in the twenty-four hours; but this medication must be limited to those whose kidneys are acting well. If this precaution is not observed antipyrine is as dangerous here as it is in other profound and lasting infections.—*Journal des Praticiens*, 1894, No. 19, p. 217.

The Treatment of Pneumothorax in the Tuberculous.

Dr. Jumon immediately relieves the violent pain by a subcutaneous injection of morphine. The dyspnœa may be relieved by dry cupping; oxygen

inhalations are likely to be of benefit. Injections of ether and caffeine ward off the collapse. Thoracentesis, done under antiseptic precautions, relieves the pressure upon the lungs, heart, and the great bloodvessels; and if the communication with the bronchi is free, it may be repeated several times. When the secondary empyema appears the liquid may be aspirated, and its bulk replaced by sterilized air, or the germs may be sterilized by antiseptic injections of solution of tincture of iodine, alcohol, and potassium iodide. Thoracotomy is indicated in a very abundant accumulation of purulent material, which is likely to give rise to septicæmia.—*Revue de Thérapeutique Médico-Chirurgicale*, 1894, No. 6, p. 159.

Ether vs. Chloroform Narcosis.

Dr. W. Körte believes that the kind of chloroform (English, chloral, or Pictet) makes but little difference; accidents have been observed with all. Deaths may take place in healthy individuals, with sound hearts, before the onset of anæsthesia; in general as 1 : 2907 chloroform anæsthesias. Gurlt collected the statistics of 14,646 ether-narcoses without death. In a study of 600 cases of ether-narcosis, it was found that under ether the pulse was fuller, stronger, and sudden diminution in the heart-strength was absent; vomiting rarer than with chloroform; after-vomiting is very rare; in over one-third of the cases albumin was found in the urine either before or after the narcosis. Bronchitis of a mild sort was observed, but severe catarrh and pulmonary inflammations were not observed. Ether is not to be used in operations upon the face and mouth. The danger from fire demands certain precautions. Disturbing symptoms did not arise; there were only three instances of respiratory disturbance, with good pulse. The general conclusions are that ether is a slower but less dangerous anæsthetic. Deaths have taken place from ether, and will take place, but they are less frequent. The incidents of narcosis do not appear so quickly as with chloroform, and, indeed, are more amenable to treatment.—*Therapeutische Monatshefte*, 1894, Heft 3, S. 125.

Thioform.

Dr. Joh Julius Schmidt states this drug possesses, over iodoform, the advantages of odor and freedom from danger, so that it may be used over large wound areas without danger. Internally it appears to be an acceptable intestinal antiseptic. It is a cheap, innocent, and pleasant dry dressing for wounds, without producing untoward symptoms, and aside from its general surgical applicability, it is especially useful in the healing of large wound-surfaces, as after burns or ulcerations.—*Therapeutische Monatshefte*, 1894, Heft 4, S.164.

The Treatment of Amenorrhœa.

Dr. Panecki cites, amongst other remedies, the good results obtained from a grain of santonin administered at night, and also the use of potassium permanganate in from one- to two-grain doses thrice daily. Probably the most useful remedy is iron. Brandt's method of irritating the uterine mucous

membrane by the introduction of sounds may result in a single flow, but can only be used in exceptional cases. In the use of electricity it is believed that the faradic current is the best, both poles being introduced into the uterine cavity, antiseptic precautions being observed. In choosing the current, that from a coil of wire thick and short, a current of quantity rather than of tension, is preferred. In case of imperfect development in uterus and ovaries, the current of tension, long and thin wire, may be preferred. The number of applications vary in number from five to thirty, and the duration from five to fifteen minutes. As to the commencement of the treatment, if the amenorrhœa is extreme, it should be begun immediately after the molimen, and continued daily; if it is slight, for ten days before the expected period will be sufficient.—*Therapeutische Monatshefte*, 1894, Heft 3, S. 110.

Quinine as a Remedy for Enuresis.

Dr. Charles S. Potts believes that enuresis is probably caused in a large number of cases by the failure of the higher centres to properly control the reflex act by which one empties the bladder, associated with a general lack of muscular power and tone; it seemed rational, as quinine is a stimulant to the inhibitory centre, that it would prove useful. Two successful cases are reported, although the quinine seemed to lose its effect in time, necessitating an increase of dose.—*Therapeutic Gazette*, 1894, No. 4, p. 217.

Bismuth Subgallate (Dermatol) in Dermatology.

Dr. J. Abbott Cantrell sums up his experience in the use of this drug as follows: (1) The drug may not be toxic; this property was not investigated. (2) It is not superior to other iodoform substitutes, as iodol and aristol. (3) It does not hinder, but rather increases discharge. (4) It is decidedly irritating. (5) It is a stimulant, rather than an astringent. (6) It cannot take the place which has been allotted to it.—*Therapeutic Gazette*, 1894, No. 4, p. 234.

The Value of Sugar and the Effect of Smoking in Muscular Work.

Dr. Vaughan Harley, from an elaborate series of experiments, has arrived at the following conclusions: (1) The periods of digestion, as well as the kinds of food taken, have a marked influence on voluntary muscular energy. (2) Irrespective of the influence of food there is a periodical diurnal rise and fall in the power of performing muscular work. (3) More work can be done after than before midday. (4) The minimum amount of muscular power is in the morning, about 9 o'clock; the maximum about 3 P.M. (5) Regular muscular exercise not only increases the size and power of the muscles, but has the effect of markedly delaying the approach of fatigue. (6) The amount of work performed on a diet of sugar alone is almost equal to that obtained on a full diet; fatigue, however, setting in sooner. (7) In fasting, large quantities of sugar (sixteen ounces) can increase the power of doing muscular work during thirty voluntary contractions from 26 to 33 per cent., and the total gain in a day's work may be 61 to 76 per cent., the time

before fatigue sets in being also lengthened. (8) The effect of sugar is so great that when added to a small meal it can increase the muscular power during thirty contractions from 9 to 21 per cent., while the total increase of work may be from 6 to 39 per cent., the approach of fatigue being at the same time retarded. (9) When added to a large, mixed meal, sugar can increase the muscular power of thirty contractions 2 to 7 per cent.; the increase in total work being 8 to 16 per cent., and a marked increase in the resistance to fatigue is shown. (10) Eight ounces of sugar taken in addition to a full diet, increases the day's work. The work accomplished during thirty voluntary contractions shows a gain of from 6 to 28 per cent., the total day's work giving an increase of power 9 to 36 per cent., and the time before fatigue sets in being lengthened. (11) Moderate smoking, although it may have a slight influence in diminishing the power of doing voluntary muscular work, neither stops the morning rise nor, when done early in the evening, hinders the evening fall. (12) Sugar taken early in the evening is capable of obliterating the diurnal fall in muscular power that occurs at this time, and increases the resistance to fatigue.—*Journal of Physiology*, 1894, Nos. 1 and 2, p. 97.

The Antiseptic Properties of Oil of Cinnamon.

Dr. D. Braden Kyle has used the Ceylon oil in the treatment of infective varieties of nasal, laryngeal, and aural affections, with marked success. He explains the action of the oil as follows: The germ being an albuminous compound, composed mainly of nitrogen, oxygen, and hydrogen, and being enclosed in a capsule of varying thickness, the chemical composition of which is cellulose, when brought into contact with the active principle of the oil, the cinnamic acid, has its cell-wall contracted, which practically deprives the germ of its nutrition. By microscopical examination this theory is confirmed. In cases in which the solution of the oil, 1 : 500, was put to the clinical test the wounds healed by first intention. However, it is not a safe antiseptic for surgical work, but it is a good mucous membrane antiseptic. It is not, however, a germicide.—*Therapeutic Gazette*, 1894, No. 4, p. 232.

The Mechanical Treatment of Anasarca.

Dr. H. Curschmann recalls the fact that for many years, and even now, incisions are resorted to in marked anasarca, although the tendency toward erysipelatous infection in the œdematous skin is very great. It is necessary to make as small and as few incisions in the skin as is possible, and experiments have been made with small canulas, needles of hypodermatic syringes, the finest possible trocars. Southey's trocars [formerly better known] have been used, the form of the canula and the point of the trocar having been modified, although these are uncomfortable and even painful for the patient. With this, as well as the other method, absolute antisepsis must be secured. Since 1882 he has employed a small glass funnel, which is placed over the site of the incision, and which is connected with a rubber tube leading to a receptacle for the escaping fluid. The fluid is thus rapidly removed, and the wound is protected from harmful outside influences, for the funnel can be attached to the skin by adhesive plaster or by iodoform collodion. Of late he has devised an instrument built upon the plan of the funnel, but with a

broader base of hard rubber, and a removable top of the same material, the side, however, being of glass. The base can be placed in position upon the skin, which has been previously sterilized, and secured as above. The incisions, three or four at most, are then made, the cover tightly placed upon the base, and firmly held by a bayonet joint, the conveying tube filled with the physiological salt solution, and the distal end is placed in the lowered receiving-glass. This apparatus operates successfully, and has given great relief in diminishing the anasarca, as well by indirectly emptying the serous cavities, and affords the opportunity for the successful use of internal remedies. —*Therapeutische Monatshefte*, 1894, Heft 3, S. 95.

Intravenous Injections of Corrosive Sublimate.

Dr. Guido Baccelli has found in his experimental work upon animals that the fears as to the results of these injections, so far as concerns the blood, were unfounded. In two patients suffering from cerebral syphilis, when the ordinary methods of internal administration, inunction and hypodermatic injection in large doses had failed, the new method gave brilliant results. The usual solution is as follows: Corrosive mercuric chloride, 1; sodium chloride, 3; distilled water, 1000. The skin must be treated with careful aseptic methods, a vein in the elbow, the back of the hand, or the leg is selected, after that the vessels are overfilled by a bandage proximally placed. The needle of the filled syringe is inserted, and the injection made into the vein; the absence of pain and subcutaneous swelling indicates that the vein has been entered. In one case the metallic taste of the mercury in the mouth was noted by the patient after a few seconds. A flow of saliva followed in five or six minutes. The first dose was $\frac{1}{64}$ gr. of the remedy, and it was increased to $\frac{1}{8}$ gr. per day, which has not been exceeded. The advantages are: (1) The small quantity of the remedy necessary; (2) the possibility of rapidly combating the symptoms which are due to the direct blood-poisoning caused by the syphilitic virus; (3) the prompt action of the remedy upon the walls of the bloodvessels, which are the favorite seat of syphilitic degenerations; (4) the immediate carrying of the drug in the blood-current to all tissues and organs.—*Berliner klinische Wochenschrift*, 1894, No. 13, S. 301.

Meat Peptone as a Heart Tonic.

Herr E. Kemmerich notes that the "Fleischpepton," which is made in South America by heating beef in closed tubes with steam under pressure, will make the pulse full and strong; yet of this there has been hitherto no exact clinical demonstration. The observations were made in the morning, the patient remaining in bed. About one ounce of the peptone was dissolved in a half-cup of hot water, a small quantity of salt being added, and cooled to blood-heat. On looking over the curves of the sphygmograph it is evident that the rate is not quickened, but rather slowed; the changes indicate that there is, under the influence of the peptone, a stronger contraction of the cardiac muscle, especially of the left ventricle. These changes are most marked after three-quarters of an hour; frequently, however, they may commence as early as fifteen minutes, and usually disappear in

about six hours. The composition of this peptone may explain its action. It consists of albumoses, 30; peptone, 18; other soluble albuminous bodies, 9 to 12 per cent., making a total of 57 to 60 per cent., besides the extractives and 8 to 10 per cent. of potassium phosphate and chloride and earthy phosphates. The large percentage of albumoses and peptones present a readily absorbable material for the nourishment of the heart muscle, while the potassium phosphate and chloride add to the action of the potash salts, which, through the raising of arterial pressure and slowing of the pulse, act as diuretics. The aromatic extractives are weak nerve-stimulants, and at the same time are excellent correctors of the taste of the albumoses, peptones and potash salts. The patients perceive a feeling of warmth, an increase of the appetite, and in consequence of the better circulation of the blood there is an improvement in the general condition. Further, in consequence of its tonic effect on heart and bloodvessels, the peptone is a mild diuretic.—*Berliner klinische Wochenschrift*, 1894, No. 10, S. 238.

The Influence of Various Diets upon the Composition of the Urine.

Dr. W. Hale White has found that, in his experience, strontium lactate will sometimes diminish albuminuria, but he has been unable to detect that the condition of the patient is in any other respect altered by taking it. Milk has been frequently recommended; it is said that it will diminish the amount of albumin. This is far from being always true, especially in chronic interstitial nephritis, and even if it were, in many cases there is no proof that this is of any benefit. It is urged that milk is easily digested and absorbed; often this is directly contrary to fact, for patients who are fed solely upon milk often suffer from indigestion; they get to positively loathe the milk, which has the additional disadvantage that it leads to constipation. It has been stated that milk does not irritate the kidneys; in young children, however, it is curious to find that these organs are frequently streaked with urates. Milk is often said to be diuretic; it is usually but not invariably diuretic, and it is doubtful whether it is well to give diuretics in Bright's disease. It has been urged that milk is beneficial because it contains no toxic substances; it may contain poisonous substances, which, although excreted in health, are retained in the blood in Bright's disease, and there is no proof that it aids in the elimination of toxic substances. Ten cases were analyzed, the composition of the daily diets being: 1. Milk; 3 pints, equalling 1076 grains of proteid; 2. Farinaceous; bread, 12 ounces; butter, 1 ounce; milk, 2 pints; beef-tea, 1 pint, equalling 1137 grains of proteid; 3. Full; bread, 12 ounces; butter, 1 ounce; milk, ½ pint; potatoes, ½ pound; meat, 6 ounces, equalling 1522 grains of proteid. With the full diet, rice pudding made with milk, ½ pound; or mutton broth ½ pint, were given on alternate days. When any of the patients showed signs of uræmia they were treated with subcutaneous injections of pilocarpine nitrate, vapor baths, compound jalap powder, or compound elaterium powder. In conclusion: The quantity of urine passed: In chronic interstitial and in chronic parenchymatous nephritis milk is sometimes, although not always, a mild diuretic. Upon a farinaceous diet more urine is passed than upon a full diet, often considerably more, but there is not much

to choose between farinaceous and milk diets. The specific gravity: The diet has no certain influence in either chronic interstitial or chronic parenchymatous nephritis, but on the whole it is lower in milk and farinaceous diets than in full diets. The amount of albumin passed: Milk diet has little or no effect in reduciug albumin in urine, sometimes, indeed, more albumin is passed upon milk than upon other diets; the albuminuria in chronic interstitial nephritis is much more severe in a farinaceous than in a full diet. In chronic parenchymatous nephritis the albuminuria is much more profuse upon a full diet than upon a farinaceous. The quantity of urea passed: It is difficult to say what is the effect of milk upon the excretion of urea; in contrasting full with farinaceous diet there is no certain influence upon the output of urea in chronic interstitial nephritis. In the chronic parenchymatous nephritis the urea excreted is often less the more proteid the diet contains. The general condition of the patient: The patients feel better and stronger on full diet, or on farinaceous diet, with fish or chicken added, than they do on milk or farinaceous diets, and this conclusion applies to both forms of nephritis. He believes that an ordinary full diet is the best for chronic Bright's disease, for, 1, it does not increase the liability to uræmia; 2, the general condition of the patients improve upon it, and they feel stronger and their circulation is better than upon milk or farinaceous diet; 3, a saving of albumin is effected, for even if the output is increased, more than sufficient extra proteid is taken in to compensate for the extra loss; 4, there is no evidence that the effect of this diet upon the excretion of the urea is harmful; 5, there is no evidence that a full diet contains, or especially leads to the formation of, any toxic principles which are harmful in chronic Bright's disease; 6, this diet prevents the repugnance felt by these patients to farinaceous diet, and their loathing of milk.—*Medico-Chirurgical Transactions*, vol. lxxvi. p. 392; also in *British Medical Journal*, 1893, vol. i.

The Creosote Treatment for Tuberculosis.

Dr. Julius Weiss presents a very careful review of the present condition of the creosote therapy. Increase of weight, diminution of cough and an arousing of the appetite are, in most cases, observed during the administration of this remedy; yet frequently patients are found who cannot tolerate the taste of the remedy, nor be induced to take it. If pills or capsules are not well borne, Hoffman's mixture (with tincture of gentian), or Bouchardat's formula (tincture of nux vomica and Malaga wine), or Van der Vloet's prescription (with tincture of nux vomica) may be substituted. Sommerbrodt used the remedy in gelatin capsules with cod-liver oil; balsam of tolu should be avoided because the pills are thus rendered insoluble; sugar-coated pills are not, however, objectionable. If creosote in these various forms cannot be taken the carbolate is generally well borne in large doses, and is equally as efficacious as the creosote itself. It can be said that creosote is not a direct specific against tuberculosis, but indirectly influences the process in the lungs by limiting the formation of expectoration and by its being a good stomachic. The majority of physicians will subscribe to the statement of Weyl, that it is the best remedy for the symptomatic treatment of tuberculosis.—*Centralblatt für die gesammte Therapie*, 1894, Heft 3, S. 129.

MEDICINE.

UNDER THE CHARGE OF

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EPILEPTIC SIALORRHŒA.

FÉRE (*Compt.-rend. hebdom. des Séances de la Soc. de Biol.*, x. sér., t. i., p. 258) has reported the case of a man, twenty-seven years old, who had had convulsions in infancy, and attacks of epilepsy and of vertigo from the age of seventeen. His father was alcoholic, and a brother was an imbecile. The attacks were characterized by their extreme violence, the movements appearing first in the face, but soon becoming generalized. The man always fell, usually upon his face, and almost always bit his tongue and passed urine involuntarily. The post-paroxysmal stupor was continued into a sleep lasting two or three hours, without return of consciousness. Salivation was always extremely abundant. Under the influence of bromides in increasing doses the frequency of the attacks was diminished and their character underwent some change. At the age of twenty there occurred about six convulsive attacks and eight vertiginous attacks monthly, while at the age of twenty-seven, while taking two hundred and fifty grains of bromide daily, there were no attacks of vertigo, and only six incomplete convulsive attacks. These attacks consisted in the occurrence of sudden pallor, marked convergence of the eyes, drawing backward of the head, stiffness of the whole body, but without falling, although with loss of consciousness. The mouth opened widely, the lower lip was shaken by rapid movements, and a copious discharge of saliva took place, continuing for some time after the rigidity had ceased and consciousness had been restored. On one occasion the amount was found by measurement to be more than two ounces and a half, and on another occasion nearly four ounces. In addition to these attacks the man had, from time to time, sudden transient discharges of saliva, without loss of consciousness and without vertigo. Reference is made to a case, previously reported, of a paretic dement in whom epileptiform attacks, in which the movements first appeared in the face, were also preceded by copious salivation. These two cases, together with results of physiologic experiments, are made the basis of the opinion that the anterior portion of the cerebral cortex, in the neighborhood of the centres for the movements of the face, contains a centre, excitation of which causes increased secretion by the salivary glands.

Hepatic Cirrhosis from Gastro-intestinal Auto-intoxication.

At the recent International Medical Congress, Hanot and Boix (*Wiener medizin. Presse*, No. 15, p. 577) described a form of cirrhosis of the liver which did not well fit, etiologically, into any of the established categories. The cases thus affected may occur in adults between thirty-five and fifty-five years old, the liver at the height of the disease being large and extending for several fingerbreadths below the costal margin, its surface being smooth and even and presenting a thickened and readily palpable margin. The viscus is remarkably hard, and manipulation occasions no pain. The spleen is not enlarged; there is no ascites; no alteration in the venous abdominal circulation, and no jaundice, although in some cases there is a slight urobilin-discoloration of the skin. The urine is in most instances normal, though it may contain urobilin and sometimes albumin in small quantity; sugar is not found. In all of the cases of this group a history of alcoholism can be definitely excluded; while tuberculosis, syphilis, malaria, and other infectious diseases cannot be demonstrated. These cases do, however, present a history of digestive derangement extending over many years, with or without gastrectasia. In cases long under observation the progressive enlargement of the liver may be evident, while the characteristic hardness is present from the outset. After having reached a certain degree of enlargement the liver remains stationary in size, even for a period of many years. The functional disturbance is slight. In addition to the derangement of digestion, there may be a feeling of heaviness in the right hypochondrium, tympanites, habitual constipation, and a certain lassitude that makes muscular effort difficult and leads readily to fatigue. There may also be acute attacks of usually transient disturbance, especially of the gastric functions, in the course of which the liver may be observed to increase in size, and the urine to contain urobilin. There may also be attacks of perihepatitis simulating hepatic colic. Histologically, a general sclerosis of the portal spaces may be found, with preservation of the central vein. The interlobular connective tissue extends in varying degree into the lobules themselves; but there is no hyperplasia of the biliary ducts. The origin of this form of sclerosis is to be attributed to the long-standing digestive derangement, in consequence of which toxic substances are generated in the gastro-intestinal canal. These are absorbed by the veins, and must find their way through the liver by the portal vein, giving rise in their passage to irritation and cellular proliferation. The prognosis as to life is not unfavorable, although individuals thus affected are more prone to infectious diseases than are healthy persons. The prognosis depends upon the condition of the liver-cells. Therapeutically, the causative gastro-intestinal derangement is to be corrected and infection is to be prevented by the administration of intestinal antiseptics.

A Case of Word-blindness, or Optic Aphasia.

Bianchi (*Berliner klinische Wochenschrift*, 1894, No. 14, p. 333) has reported the case of a printer, seventy-one years old, who for several months had been having attacks of vertigo, with loss of consciousness, as well as epileptic seizures. A severe paroxysm of the latter was followed by right hemiplegia

and aphasia. Motility was soon regained, but the defect of speech persisted. It was found that common sensibility and the muscle-sense were impaired, while the thermic sense, the sense of pain, and that of pressure were preserved. Vision had for some time been lost upon the left side by reason of the presence of a cataractous lens. There was considerable limitation of the field of vision upon the right, the temporal side being hemianoptic. Hearing was impaired upon both sides. Taste and smell were preserved. The pupils reacted tardily to light and in accommodation. Motility was intact, except for a slight degree of paresis of the muscles of the left side of the face. Speech was notably affected. The patient comprehended what was said to him, but was unable to answer. Speech was broken and jerky, and, particularly when a sentence was begun with a pronoun, a verb, or an adverb, there was an inability to proceed. Nouns especially seemed wanting. If the word was supplied, it was at once repeated with evident satisfaction. Speech was notably deficient in the names of classes and persons. The man would forget his own name. Articulation *per se* was perfect. The power of reading was lost, although occasionally a syllable could, with a great effort, be read, but two or more syllables could not be connected. The man could write well upon dictation, but on writing spontaneously he would make many mistakes. Transcription was not at all possible. There were at times visual hallucinations, evidently affecting the right half of the visual field. While under observation the man had numerous left-sided epileptic attacks, and in one of these death took place. Upon post-mortem examination, a small area of softening was found in the right hemisphere in the outer segment of the lenticular nucleus; another was found in the white matter of the first frontal convolution, close to its foot; an old similar area was further found in the corpus callosum in relation with the splenium, extending upward to the precuneus, of which it involved the lower third, and through the gray matter to the white. In the left hemisphere there was an old area of softening in relation with the angular gyrus, destroying the gray substance of the first temporal sulcus in its posterior portion; another area not involving the first and second temporal convolutions, but extending through the white substance of the angular gyrus to the posterior horn of the lateral ventricle, leaving free, however, the gray substance of the occipital lobe. Any relation between the verbal amnesia and the lesions in the right hemisphere is to be excluded, principally because the disturbance of speech appeared after the attack that caused the transient right hemiplegia. It is pointed out that memory-images of mind-speech are not always derived from the word-auditory centre, but in some special cases from the word-visual centre. Heredity, education, occupation, etc., may so fortify visual impressions that these may preponderate in the mechanism of speech, so that speaking and writing may be performed independently of auditory memories. It is considered evident that under these conditions there is a connection between the verbal-auditory centre and the verbal-visual centre, so that a destruction of the latter leads not only to simple alexia, or even blindness—the absence of memory-images of speech in this case prevents the exercise of the motor function of speech and writing, and as the individual is blind for written language, he is rendered amnesic for spoken as well as written language. The case reported illustrates the influence of occupation upon disturbance of function. Having been a printer

for many years, a close relation had been established between the visual images of letters, syllables, and words and the corresponding motor conceptions, more so than between these and auditory images. As a result the auditory images were incapable of arousing the visual images, and by reason of defect in the visual organs the patient could not reproduce images of words, and could not thus give expression to thought in words.

Syringomyelia, with Lesions of the Skin and Mucous Membranes.

Neuberger (*Wiener medizinische Presse*, 1894, No. 12, p. 445) has reported the case of a man, forty-three years old, who presented numerous areas of ulceration, some thirty in number, of irregular outline and varying size, all over the body. There were, besides, pigmented areas in places and radiating cicatrices in other places. Seven years previously it was believed there had been syphilitic infection, followed in the course of a few months by painful ulceration and swelling of the tongue. This phenomenon recurred from time to time, despite careful constitutional and local treatment, the individual attack, however, usually subsiding in within a week or two weeks. Excellent results followed potassium iodide in doses of 15 grains, increased in the course of a few days to 30 grains three times daily, daily subcutaneous injections of europhen, gr. $\frac{1}{6}$, and applications of mercurial plaster. The peculiar involvement of the mucous membrane of the mouth returned, however, at almost regular intervals, until death took place rather suddenly. These attacks usually set in suddenly with a sense of intense burning in the tongue, and the appearance, particularly at the tip and along the right border, of small vesicles, that soon ruptured and left small ulcerated areas that were extremely painful and greatly interfered with speech and rendered impossible the ingestion of solid food. These patches were, at first, of roundish outline and covered with a yellowish deposit and surrounded by a reddish areola, but after a time they tended to become confluent. At a later period the left border of the tongue also became affected. In a little while the entire organ became enormously swollen. In the intervals between the paroxysms ulceration sometimes took place in the fissures present. On no occasion was there fever. At the times of the attacks there were also pricking sensations in the face. Sometimes, too, the tonsils were swollen and the seat of a yellowish deposit. The condition affecting the mucous membrane of the mouth and pharynx was believed to be pemphigus, non-syphilitic in character. On one occasion an eruption of vesicles was observed upon the extensor aspect of the right hand, and on another occasion a similar eruption on the middle toe of the left foot. A short time before death it was observed that while common sensibility was everywhere intact, there was total analgesia in various parts of the body. The man was able to discriminate heat from cold. Death took place suddenly amid manifestations of asphyxia. Upon post-mortem examination the tongue was found swollen, fissured, and ulcerated. The epiglottis was enlarged and reddened. The entrance to the larynx was closed by intense edema of the ventricular bands. The mucous membrane of the larynx was thick and rugous, in places eroded, and here and there, particularly upon the arytenoid cartilages, presenting frothy, yellowish secretions, probably

derived from the rupture of pre-existing vesicles. The mucous membrane of the trachea was hyperæmic, swollen, and covered with frothy secretion. The central canal of the spinal cord was found dilated, and, besides, there was an adventitious cavity, particularly marked in the cervical and dorsal segments, and involving the right posterior horn. In a summing up of the case, the opinion is expressed that death resulted from an eruption of vesicles in the larynx, with consecutive œdema of the ventricular bands. The question of syphilis is believed to be doubtful, and the possibility of a relation between the lesions of the epithelial surfaces and the spinal process is suggested. Brief reference is made to a case of syringomyelia with cutaneous lesions, previously reported.

Acute Ascending Paralysis.

Jolly (*Berliner klinische Wochenschrift*, 1894, No. 12, p. 281) has reported the case of a man, forty-one years old, who was rather abruptly seized with a sense of heaviness in the lower extremities, progressing in the course of a few days to complete paralysis. The upper extremities then became similarly involved, though not to the same degree. There was, besides, some difficulty of speech and of respiration, and impaired mobility of the face, with increased frequency of the pulse and slight elevation of temperature. There was likewise some weakness of the muscles of the neck, so that the head could scarcely be raised or rotated. The eyes could not be firmly closed, and there was some difficulty in mastication. The external rectus muscle of either eye was palsied. The left pupil was larger than the right and both pupils reacted but feebly to light, but well in convergence. Distant vision was fairly good, but near vision was distinctly impaired. Optic neuritis was found upon both sides and the right disk was the seat of quite extensive hemorrhage. Sensibility was impaired, particularly in the hands and feet. Some of the muscles of the forearm, of the leg, and of the face, displayed reaction of degeneration. The activity of the sphincters was preserved. The knee-jerks were wanting. The man had previously been in robust health, but on inquiry it was elicited that he had for a long time drank beer in large quantity, and that he used tobacco to excess. As time went on the symptoms slowly but progressively improved. The case was diagnosticated as one of multiple neuritis presenting the character of acute ascending paralysis. From numerous considerations the conclusion is reached that most cases of acute ascending or descending paralysis owe their origin to multiple neuritis or to localized myelitic or metencephalitic processes or to combination of these conditions, although under certain circumstances the causative agency (intoxication or infection) may be effective without discoverable microscopic change.

Cyst of the Cerebellum.

Jackson and Russell (*British Medical Journal*, No. 1730, p. 393) have reported the case of a man, thirty years old, who came under observation with symptoms that were believed to depend upon the existence of a tumor of the cerebellum. Three years previously he had suffered with headache, vomiting, staggering with a tendency to fall backward, and with attacks of

vertigo. He had, besides, other attacks, in which it was doubtful whether he lost consciousness or not. All of the symptoms disappeared with the exception of the headache, which, however, had been present for four or five years, but which previously had been relieved by correcting the co-existing constipation. A year later the man was thrown down, striking the back of his head; he was also kicked on the head, but he did not lose consciousness and was quite well the next day. Six months after this, in diving, he struck the vertex of his head on a stone and was made unconscious for half an hour. He vomited from time to time for five weeks, and was then well enough to resume his duties as a police constable. A year before coming under observation vomiting would occur nearly every morning on arising from bed, before food was taken, and also during the day, especially after meals. On looking up or on suddenly looking round to either side, the man became giddy and his sight dim, but the giddiness passed off in a few minutes if the eyes were closed. If he turned abruptly in bed at night he felt giddy and stupid, and it took some time for him to be sure of his position. When giddy there was always a tendency to fall backward, and on several occasions the man actually fell. Pain had first been felt in the forehead, then in the occipital region, and finally at the vertex and the centre of the head. The symptoms gradually progressed. For six weeks there had been jerkings of both hands and feet, but the face was never drawn, and speech was not affected. Vision had been notably impaired for six days. A year before there had been ringing in the ears for a period of three months. There was no history of syphilis and no evidence of hereditary predisposition to malignant or tuberculous disease. The patient was well developed, but pale, worn, and drowsy in appearance. Speaking and thinking evidently required effort. Percussion of the skull elicited general tenderness, no one point, however, being more sensitive than another. The sense of smell was less acute on the right than on the left. Vision was 6/9 on the right, 6/6 on the left. There was intense bilateral optic neuritis, but no hemianopsia. There was neither ptosis nor strabismus, but on lateral deviation the globes moved in a "punctated" manner, and there were occasional nystagmoid jerks. The pupils were 5 mm. in diameter and equal; they reacted normally to light and on accommodation. The functions of the motor and sensory divisions of the fifth nerves were preserved. The only evidence of asymmetry of the face consisted in a trifling drooping of the right angle of the mouth, apparent, also, on showing the teeth; but on smiling and closing the eyes the facial movements on the two sides were equal. The power to raise the eyebrows and to frown was lost, and there were no transverse lines across the forehead. The ticking of a watch was heard at a distance of six inches from either ear. The tongue deviated slightly to the right when protruded, and was tremulous. The uvula was slightly deflected to the left, but the movements of the palate were equal on the two sides. The palatal reflex was present and was alike on the two sides. There was no dysphagia. Sensibility was everywhere preserved. Active and passive movement of the head on the trunk was restricted in all directions, as every change in the position of the head was attended with pain, so that the patient was afraid to move it or to allow it to be moved. There was no rigidity of the muscles, though there was occasionally a feeling of stiffness. The patient was right-handed, and

the dynamometer registered 120 on the right and 100 on the left. The muscular sense in the upper extremities was normal, but in attempting to touch the nose, with the eyes closed, the left hand was slightly at fault. There was no rigidity. The tendon-reflexes were well marked and slightly the more pronounced upon the left. The superficial abdominal reflexes were present and alike upon the two sides. There was slight but distinct weakness of the muscles of the back, associated with some degree of lordosis on standing with the feet close together. The abdominal muscles shared in this weakness. The plantar and cremasteric reflexes were the less marked upon the left. The gait was reeling, but there was no waddling. The left lower extremity was slightly stronger than the right. There was no rigidity, but the knee-jerks were increased, the right more than the left; there was ankle-clonus on the right side and only a tendency to clonus upon the left. The muscular sense was slightly defective, with a tendency to fall to either side or backward. The man could stand steadily with the feet in apposition when the eyes were open, but swayed when the eyes were closed. Constipation existed. There was some weakness of the detrusor urinæ. Sexual power was not altered. There was no respiratory or circulatory lesion. While under observation, after a day of severe headache, attended with occasional vomiting, the man suddenly lost consciousness and his breathing ceased, although his pulse continued fairly good. Artificial respiration was at once instituted and persisted in for eight hours and a half, when the heart stopped beating. The pulse kept up well for some hours, but gradually became weaker. The post-mortem examination revealed a cystic condition of the cerebellum. On cutting through the inferior velum and raising the medulla the fourth ventricle was seen to be widened; its floor was normal, but its roof was formed by the thin transparent floor of a cyst. The posterior wall of the cyst was gelatinous and uneven, possibly indicative of tumor, but the anterior wall was smooth. The cyst also excavated the lateral lobes, notably the left. The medulla was flattened, as were the cerebral convolutions, and the lateral ventricles of the cerebrum were dilated. The opinion is expressed that the condition of paresis of the muscles of the trunk was a direct result of the destruction of cerebellar tissue, and not a secondary effect resulting from pressure by the cyst upon the pyramids. Otherwise, it would have been reasonable to have expected to find marked loss of power in the lower extremities.

Embolic Hemiplegia in the Course of Variola.

Davezac and Delmas (*Journal de Médecine de Bordeaux*, 1893, No. 38, p. 421) have reported the case of a woman, thirty-three years old, who had never been vaccinated, but who was exposed to variolous infection, and developed an attack of the confluent form of the disease. During convalescence she was seized with a convulsion in which she became unconscious. When consciousness was resumed it was observed that the left arm and leg were paralyzed. The convulsive seizure had been preceded by a feeling of pain in the abdomen, as if a tumor present were being twisted. Those who witnessed the attack stated that the jaws were moved and the teeth ground. The lids were alternately opened and closed actively, and the eyes were rolled upward. Upon examination, the eyes and pupils were found to be normal,

and the face perfectly symmetrical. The left leg and arm were completely paralyzed, but sensibility was not altered. The spleen was slightly enlarged. The heart presented no lesion, and the vessels were soft, though a little tortuous. The activity of the sphincters was preserved. The knee-jerk was diminished upon the left. The temperature was 103°. The respiration was accelerated and jerking. The percussion-resonance was impaired at the base of the left lung, and the breath-sounds appeared distant. At the base of the right lung fine subcrepitant râles could be heard. The woman gave a history of having had enteric fever at the age of eighteen years, of scarlatina at twenty-one, and of influenza at thirty-one; but there was no history and no evidence of syphilis. Therapeutic attention was directed to the pleuro-pneumonia at the base of the left chest, but despite vigorous treatment a large effusion accumulated. The palsy displayed a tendency to recede. In the course of two weeks dyspnœa became so marked and the general condition so poor that thoracentesis was decided upon, and about a pint of pus was evacuated. Under continued treatment for the next week a tendency to improvement was evinced. At the end of this time, however, while the patient was quietly taking her dinner, an hour after irrigation had been practised, she was suddenly seized with an epileptiform attack, attended with loss of consciousness. A series of four attacks occurred in rapid succession, terminating in death. Upon post-mortem examination, the pleuro-pneumonia was found to be doing well and not of a tuberculous character. The right lung was congested in its inferior third. The heart was small, and presented on its surface several areas of adherent pericarditis. The vessels were not atheromatous. The tracheal and bronchial glands were indurated, but not tuberculous. The kidneys were pale and little increased in size. The liver and the spleen presented a similar appearance. The left cerebral hemisphere was perfectly healthy throughout. The right hemisphere was injected and depressed beneath below the general level in the posterior and superior portion of its middle third. At several points the cortical structure in this situation came away with the membranes, the removal of which disclosed an area of acute softening, extending from the median boundary of the convexity almost to the fissure of Sylvius. This area was brownish-red in color, with a few yellow points in its midst. Above, it involved the cortex to a depth of more than half an inch, and below to a depth of one-fifth of an inch. It included the summit and the posterior half of the ascending parietal convolution, and the adjacent portion of the superior and inferior parietal lobules. The middle of this area was traversed by the third branch of the Sylvian artery. It is believed that at the time of the first convulsion the third branch of the left Sylvian artery was occluded by an infective embolus, the presence of which in turn gave rise to the development of an encephalitis with softening.

SURGERY.

UNDER THE CHARGE OF

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SUB TROCHANTERIC OSTEOTOMY.

KIRMISSON (*Rev. d'Orthop*, March, 1894) reports four cases of congenital luxation of the thigh, in which, on account of their advanced age, with pronounced flexion, associated with considerable adduction, he performed subtrochanteric osteotomy.

The operation of Hoffa is applicable only to children under ten years of age. This operation is applicable to all ages, and in patients in whom the deformity increases as age advances. The slipping of the head of the femur backward into the iliac fossa causes a flexion and adduction and extreme lordosis, destroying power and function. It is to overcome the resulting deformity, and especially the lordosis, that he would advise this operation.

The operation is not advisable for all cases, and his purpose is only to recommend it in cases of old luxation having as well considerable lordosis associated with very pronounced adduction.

THE FILLING OF BONE DEFECTS WITH FOREIGN MATERIAL.

MARTIN (*Centralbl. für Chir.*, 1894, No. 9), in an interesting paper, discusses the results which he obtained in following up the line of research originated by Dreesmann and Mayer.

He showed that in dogs aseptic plaster-of-Paris and base-plate gutta-percha can be used to fill up bone defects, and that the filling will be covered over by either primary or secondary union of the soft parts.

In the first case cited, the wound healed smoothly by primary union over a filling of plaster-of-Paris, and the dog made a complete recovery. In the second case, plaster was also used, but the dog tore away the dressings and opened the wound; some of the plaster escaped, but the wound healed by granulation. The post-mortem examination, made twelve and one-half months after the operation, showed that the plaster had been absorbed and that the bone defect had been completely replaced by new bone tissue.

In the cases in which base-plate gutta-percha was used, primary union followed in the first case, and the post-mortem made five months after operation showed the gutta-percha fast and immovable in the medullary canal, completely surrounded by healthy bone. The second dog showed on post-mortem, eight

and one-half months after operation, the gutta-percha all but surrounded by solid bone, only touching the soft parts in one small point; although the dog had torn away the dressings and opened the wound, it had healed by granulation. There had apparently been partial absorption of gutta-percha, since it had been replaced where it lay outside the medullary canal, by hard bone tissue in both cases. In contrasting it with the plaster of-Paris, it was noted that it was not so readily absorbed. The use of plaster-of-Paris is perhaps a little easier; it should, however, be reserved for large cavities, the use of gutta-percha being limited by the amount of bone defect. Plaster-of-Paris is more easily removed when it is necessary.

The gutta-percha has the advantage of being both resistant and elastic when it is hardened. It should, therefore, be used where considerable resistance is required, as where the bone-walls are thin; but in cases where considerable strength is required, as solutions of continuity and total loss of bone substance, nothing can be expected from this method, and ivory is to be preferred.

The good restoration of the form of the bone is noteworthy, as shown by the complete covering of the gutta-percha filling by the new bone-growth.

The author believes that it is more necessary, in order to make progress, to find a method that will make bone cavities aseptic, than to find, as some experimenters have tried to do, an antiseptic substance that may be used to fill the cavity in the bone. He does not, however, mean to imply that plaster-of-Paris and gutta-percha are the only substances that are non-irritating and yet suitable for the purpose.

An advance in the antisepsis in bone cavities has been made by Dreesmann, who employed boiling oil. But the practical results of this method are not what they might be, as there is produced a slough which separates the living tissue from the material used to fill the cavity, and this forms a culture medium for bacteria.

The combination of König's skin and periosteum flap transplantations with the above method is productive of better results.

The Lettsomian Lectures on Peritonitis.

In introducing his course of Lettsomian lectures, Mr. Frederick Treves justly comments upon the terrible prominence occupied by peritonitis in our mortality records. This fact, together with the existing diversity of opinion concerning the nature and treatment of this affection, makes the selection at this time a happy one; and, although these cannot be definitely settled at present, a long stride has been taken toward the scientific study of the subject. The originality of thought which is characteristic of the author is very apparent in these lectures (*British Medical Journal*, 1894, Nos. 1727, 1729, and 1732), and he proves himself familiar with the most modern advances in pathology.

At the outset the commonly accepted view of the inflammatory process is rejected. It is shown by illustrative cases and rational deductions that inflammation is a conservative process. The inflammation that surrounds an infected wound or a tuberculous area is a wise provision of Nature to check the invasion of the deadly micro-organisms. It may be assumed, the author

states, that if the process of inflammation was to absolutely disappear from the human body, the race would in a short time become extinct. It is patent, of course, that inflammation may be excessive, that it may fail in its purpose, and that the process frequently needs the controlling influence of surgical or therapeutic measures. What has been thus stated in regard to inflammation applies with equal force in inflammations of the peritoneum.

The most common symptoms in cases of fatal peritonitis are those of poisoning and not of inflammation, and the fatal issue is the result of toxæmia rather than inflammation of the peritoneum.

In the most rapidly fatal cases of peritonitis, post-mortem examination frequently shows the most insignificant changes, while those cases in which there is frank suppuration are often the most favorable.

The pronounced differences in the phenomena which attend inflammations of the peritoneum and of other serous membranes, is dwelt upon at considerable length.

It is pointed out that the peritoneal cavity does not exist in health, but in performing cœliotomy air enters, the organs recede, and a cavity is then manifest. It is suggested that this disturbance of pressure relations must affect the sensitive tissues and thin-walled bloodvessels within the abdomen. This may explain either wholly or in part the remarkable improvement which has frequently followed exploratory cœliotomy. A large number of such cases have been collected by J. William White ("The Curative Effect of Operations *per se*," *Annals of Surgery*, August and September, 1891).

Many other interesting peculiarities of the peritoneum are described, but for want of space must be passed over here.

The etiology of peritonitis has been much simplified by recent bacteriology. It is stated that peritonitis depends almost entirely, if not entirely, upon infective processes, while the existence of non-infective peritonitis is becoming rapidly more and more dubious. Usually the process is that described as continuity infection, by which is meant extension of the disease from some adjacent organ. The following classification is offered as expressing our present knowledge of the subject:

1. Peritonitis due to infection from the intestine.
2. Peritonitis due to infection from without.
3. Peritonitis due to the pneumococcus.
4. Tuberculous peritonitis.
5. Peritonitis of a doubtful nature.

The symptoms of peritonitis are so familiar to every physician that only special features are discussed. Want of space forbids a discussion of these. Two points of especial importance, however, demand notice. One is that vomiting, if persistent, even though slight, is of grave import, and the other refers to the influence of constipation in peritonitis following appendicitis. Mr. Treves' statistics show that the prognosis is better in those cases in which free bowel motions occurred.

To the physician the most important feature is that which refers to the treatment, and this part of the subject has therefore been fully made use of in this review.

Rest should be absolute; the knees may be flexed over a pillow; the chest

and arms should be protected by a woollen jacket, as it is impossible to keep the patient covered on account of the extreme restlessness.

Feeding. The rule should be to give as little nourishment as possible by the mouth. Both absolute prohibition and reckless intemperance in the use of ice and the various liquid substances should be guarded against. Nourishment is to be provided by rectal injections of small quantities of peptonized liquids.

Opium. The advice of the author is distinct upon this point. The rule should be to get along with as little as possible in the acute forms. Morphine, hypodermatically, is absolutely essential, but as a routine treatment it is objectionable. It masks the symptoms, hinders the natural process of cure, and hampers treatment. The indication for its use is actual pain.

Aperients. By aperients is meant those means employed for the purpose of soliciting the action of the bowels, whether this be the administration of drugs or the employment of enemata. The value of aperients in peritonitis is a subject upon which diametrically opposite views are held by the profession. According to Mr. Treves they can never form a part of the routine treatment. In the first place, in many of the most urgent cases they fail entirely to act, and in the event of success it is stated that the treatment would probably not influence favorably the prognosis. The fatal poison is circulating in the patient's system and beyond the reach of purgative measures. The fact that the alimentary tract contains poisonous matter is not overlooked, and to a certain extent aperients may assist in the elimination of this. Some disturbance of the bowel wall is needed, however, to render the poisonous contents of the intestine acutely poisonous and to favor its introduction into the system.

In the conditions, however, which tend to develop peritonitis, the early employment of aperients is frequently of the greatest value. Such are perityphlitis and pseudo-ileus, or the intestinal paralysis sometimes following abdominal operations. The value of an aperient before an operation must have been observed by all surgeons of experience in this line of work. In fully established peritonitis and in the septic form of the disease no benefit can be expected from the use of aperients.

Bloodletting. This measure is recommended particularly in localized peritonitis in a robust person. In perityphlitis the effect of the application of half a dozen leeches is often magical. No good results seem to have followed bleeding in general peritonitis.

Operative measures. These include incision and drainage with or without irrigation. This treatment is separately considered in its application to the two distinct classes of cases of peritonitis. In one there is a well-marked, limited inflammation with pronounced local symptoms, and with the formation of pus, in greater or less amount, the exudation, however, being limited. In the other class the inflammation is diffuse, the constitutional symptoms predominate, the changes in the peritoneum which are apparent are slight, and bear no relation to the overwhelming character of the general disturbance. Cases coming under the first class are such as those complicating appendicitis, the various forms of pelvic peritonitis, and the subphrenic inflammation, and those cases following injury or perforation that remain localized. The second form includes the general peritonitis following perforation, strangu-

lated hernia, puerperal peritonitis, and the cases of genuine inflammation following upon abdominal operations.

In the first series, operation is comparable to the evacuation of a large abscess, while incision and irrigation in the second class has in view the same object as washing out of the stomach after an active poison has been ingested. Of the operative treatment of suppurative peritonitis, especially if localized, the past records show scores of successes. Modern surgery, the author tells us, can only lay claim to greater boldness, increased frequency of operation and less delay. Doubt is expressed, on the other hand, if a single life has been saved by operation in a case of general peritoneal toxæmia, exception being made of course of tuberculous peritonitis.

Regarding operations the following are among the suggestions offered: The usual measures for securing surgical cleanliness. In localized purulent peritonitis the incision should be made by the most direct route. After the pus has been evacuated a fenestrated rubber tube is introduced and an absorbing dressing applied. Squeezing or curetting of the cavity is objected to as being productive of no good, while harm may follow. After twenty-four or thirty-six hours diurnal irrigations should be employed. In generalized serous peritonitis, after incision the peritoneum may be dried and the wound closed. If the exudation is sero-purulent, or purulent, the cavity is to be irrigated with 0.6 per cent. sterile salt solution at the temperature of the body. After drying the cavity as before, exposed portions may be dusted (excepting children) with iodoform. In tuberculous peritonitis the best results are said to follow simple incision, without either irrigation or drainage. In the cases of plastic peritonitis, which is apt to accompany perforations, the greatest gentleness of manipulation is necessary, lest the perforation be reopened in case it had become closed with lymph. In these cases irrigation and drainage will usually be unnecessary.

In order to avoid peritonitis after abdominal operations, it is essential that the operating-room, the instruments, and utensils, and the surgeon and his assistants, be absolutely clean; this end, it is stated, can be attained without the use of chemicals by the vigorous use of soap, water, and brush. Ligatures and sutures are by preference kept in an ethereal solution of corrosive sublimate, being dipped in sterilized water just before use. Instruments are placed in 1:20 carbolic solution for fifteen minutes; before being used the liquid is diluted with sterilized water until the strength is 1:80 or 1:100. Gauze sponges answer very well; they may be sterilized in 1:20 carbolic solution, which is to be largely diluted before they are used for reaching the depths of the cavity; ordinary sponges prepared in the same manner and fastened to holders, are the most suitable. It is important, of course, to do the least possible violence to the peritoneum. After having tried every method of closing the abdominal wound, the author recommends a continuous suture of fine silk in the peritoneum, and interrupted silkworm-gut sutures embracing the entire thickness of the abdominal wall except the serous membrane. The peritoneal sac should be left as dry and clear as possible, bleeding should be carefully arrested, and all clots, pus, cyst fluid, and the like, should, when practicable, be removed; but care must be observed that these are not obtained at the cost of undue violence to the peritoneum. For the removal of blood-clots and localized collections, the sponge is to be preferred to irrigation. If,

however, it is necessary to cleanse the general cavity, the 0.6 per cent. salt solution at blood-heat should be employed. Drainage will be necessary if a noxious material is left in the peritoneal cavity, or if it is expected that an extensive effusion will follow. Objection is made to the glass drainage-tube on account of its rigidity. The fenestrated rubber tube meets all indications, and is free from this objection; occasionally the use of strips of iodoform gauze will best secure the necessary drainage.

In conclusion, the author remarks that the surgeon's position with regard to peritonitis is, at the present time, similar to that which obtained some thirty years ago in regard to external inflammations. His efforts are directed against the effects of damage already done, rather than toward measures of prevention.

OBSTETRICS.

UNDER THE CHARGE OF

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Two Cæsarean Sections for Cicatricial Stenosis of the Soft Parts.

KAYSER (*Zeitschrift für Geburtshülfe und Gynäkologie*, Band xxvii., Heft 2) reports in detail the histories of two cases operated on at the University Frauenklinic at Giessen. The first patient was twenty-nine years old and at the end of her second pregnancy. In her first labor the child had apparently been extracted by forceps after cephalotripsy had been performed, and six weeks later the patient had been operated on for vesico-vaginal fistula by Prof. Löhlein, with favorable result. On vaginal examination it was found that the vagina was narrowed, and stretching from the cervix backward and on all sides were strong bands of cicatricial tissue. On the anterior vaginal wall the cicatrix of the old operation for vesico-vaginal fistula existed as a hard swelling. A true portio was not present, but in place of it there existed only a flat projection, in which, high up toward the promontory, the external os uteri existed as a small shallow cavity. A double promontory with some sacral lordosis were present. Induction of labor by means of hot and cold vaginal douches, tampons, etc., was tried without success, the cervix being only capable of a small amount of dilatation, owing to the existing cicatricial tissue. As the patient earnestly desired a living child, and it was feared that deep cervical incision might lead to unfavorable results for mother

and fœtus, the Cæsarean operation was decided on and performed on the fifth day after the patient's admission, the child being safely delivered. No unfavorable symptoms occurred to the mother except slight secondary hemorrhage from the vagina, which was easily controlled by an ice-bladder and ergot. Both mother and child left the hospital in good condition, though in the former the old scar tissue still remained and no portio could be felt.

The second case was a II-gravida, who gave a history of having been delivered of a dead child by forceps after a labor of three days. From this a vesico-vaginal fistula developed. The vaginal entrance, the canal itself, and in particular the inferior portion of the recto-vaginal septum were very much narrowed by cicatricial tissue. A urethro-vaginal fistula also existed. Both fistulæ were closed by operation, but the vagina remained in a state of incomplete atresia. The patient's pelvic measurements were as follows: Sp., 22.3; Cr., 25.5; Tr., 29; Conj. ext., 18.5. In the hope of helping dilatation of the soft parts and of exciting uterine contractions, warm vaginal injections of carbolic acid solution and tampons were tried without success. As it seemed impossible to bring a living child through the unyielding cervix and vagina, it was decided to do Cæsarean section. Considerable hemorrhage was encountered during the operation, but was successfully controlled. The child weighed 1850 gms., and was living. The mother, after a somewhat variable puerperal period, died in coma on the eighth day, and at the autopsy the following conditions were found: Fatty degeneration of the heart with anæmia of all the organs. Spleen enlarged, and in the gall-bladder, which was considerably enlarged, were found many gall-stones. In pieces of the uterine tissue subjected to bacteriological examination there were found in the endometrium strepto- and staphylococci with other bacteria, while in the muscular tissue only small oval forms were present. A guinea-pig inoculated from the endometrium died in twenty-four to thirty-six hours, whilst another into which a solution of the muscular tissue was injected remained healthy. The child of the second patient died of icterus.

Six Cases of Bright's Disease in Pregnancy and Labor.

Herman, at a meeting of the Obstetrical Society of London (*Lancet*, January 13, 1894), presented the histories of six cases of Bright's disease occurring during pregnancy and labor. From the comparisons of the histories of the above and others published in the Society's *Transactions*, he concludes that there are at least two kinds of renal disease to which a pregnant woman is especially liable. One of these is a very acute disease in which premonitory symptoms are either absent or of duration measurable by hours or days. It attacks chiefly primigravidæ and often causes intra-uterine death of the child. The above form of the disease is also attended with extreme diminution of the quantity of urine; the small amount that is passed being greatly deficient in urea, but containing enough albumin to make it solid on boiling. This form of disease is accompanied with rapidly occurring fits; but if it runs a favorable course, the fits cease and the urine increases in amount, the percentage of urea rising therein. If the excretion of urea is not re-established the case quickly ends fatally. Such cases seldom, if ever, pass into chronic Bright's disease. The other is a disease which attacks older subjects, chiefly

those who have previously had children. Its premonitory symptoms extend over a period of weeks or months, and often lead to the intra-uterine death of the fœtus. This form of the disease is generally accompanied by increase in the quantity of urine, with copious loss of albumin, but not so much in proportion to the urine as in the more acute disease, and with diminution in the elimination of urea, but not to such a degree as in the more acute form. Delivery is followed by temporarily increased diuresis and increase in urea elimination. This form may, the elimination of urea continuing low, pass into chronic Bright's disease.

The presence of albuminuric retinitis affects the prognosis unfavorably. When the pressure within the abdomen is greater than usual, the amount of urine may be diminished, but in such cases the diuresis and augmentation of the urea elimination after delivery are proportionately greater. In the acute disease, which causes eclampsia, and in the chronic disease when it is associated with excessive intra-abdominal pressure, much of the albumin is paraglobulin. The cases in which the albumin is mainly serum-albumin generally either die or pass into chronic Bright's disease.

The paper was discussed by members present, and a few cases bearing on the above were cited.

The Nature and Treatment of Asphyxia Neonatorum.

Morrison (*Lancet*, 1894, No. 3678), while admitting the essential cause of asphyxia neonatorum to be interference with placental circulation, prefers to group this disorder with diseases of the circulation, instead of classing it among disorders of the respiratory organs as some authors do. The causes of asphyxia and its relation to atelectasis are dwelt on, and the importance of the use of the stethoscope as a means of learning the condition of the fœtal circulation during birth is emphasized. The physiology of the placenta and fœtal circulation are explained; special attention being called to the anatomical peculiarities of the umbilical cord. In the average cord, the most notable feature is the special arrangement of the bloodvessels; the arteries becoming wider as they approach the placenta, and this, according to Galabin, is for the purpose of diminishing the circulation toward the placental end of those vessels. The author believes that in addition to this function, this arrangement has an influence in producing the cardiac retardation noted in the fœtus when the uterus contracts. Associated with this, the spiral course taken by the umbilical vessels must be regarded as erecting a barrier against excessive afflux and reflux of blood either toward the placenta or fœtus.

The evidence of threatened fœtal death is the disordered action of the heart. The dying adult heart usually quickens, and may even asume the "tic-tac rhythm" of fœtal life. The expiring fœtal heart, on the other hand, becomes progressively slower until it ceases to beat, and therefore a decreased frequency in the number of the child's heart-beats (except during uterine contractions), and not acceleration, usually portends danger. Such changes in the child's circulation may be detected by auscultation with the stethoscope, and are only liable to one fallacy—the temporary loss or lessened audibility of the fœtal heart from change of position on the part of the fœtus; if, however, lessened audibility be associated with normal accelera-

tion, this sign may be regarded as due to distance of the heart from the surface of the abdomen, rather than to diminished vitality of the fœtus. When, in addition to the changes before noted, attempts either at abdominal or thoracic respiration are made by the fœtus during obstetric manipulation, the danger to its life is imminent. When sufficient air is in the uterine cavity, the recurrence of the intra-uterine fœtal respiration may be denoted by a fœtal "cry" —*vagitus uterinus;* and the author believes that on more than one occasion he has heard the fœtal cry before the delivery of the head in the case of multiparæ, in whom the infra-uterine section of the birthway has been fully dilated—a *vagitus vaginalis.*

Symphysiotomy without Bone Sutures.

Bensinger (*Centralblatt für Gynäkologie*, 1894, No. 7) reports a case of symphysiotomy in a multipara with a generally contracted pelvis. After incising the bone, leaving the ligamentum arcuatum untouched, the bones separated two centimetres. The forceps was then applied, and a living female child extracted. During the delivery the ligamentum arcuatum was broken, and the bones separated six centimetres. A small tear and some hemorrhage resulted. The writer makes the case a text for discussing the objections to bone sutures. Catgut he regards as insecure and too quickly absorbed; wire will contuse or crush the porous bone tissue of the symphysis; but the greatest objection to suture into the bone is, that in symphysiotomy the wound must be drained. Experience shows that bone sutures, if not in absolutely closed wounds, invariably suppurate. In his case, after careful suturing of the fascia and soft parts with five silk button stitches, and drainage through the lower angle of the wound with iodoform gauze, a firm bandage and fixation band were put on. The fixation bandage is made of firm elastic webbing, 25 cm. broad, edged with drilling and furnished with buckles. It is well wadded to prevent fouling. It may be covered with gutta-percha paper. The wound healed by first intention, and on the fourteenth day the patient left her bed. No tenderness was found over the pubes, and at the point of section firm cartilaginous union 1 cm. broad can be felt. The woman walks with perfect ease.

Is Fracture of the Clavicle a Contra-indication for Swinging a Deeply Asphyxiated Child?

Schultze (*Centralblatt für Gynäkologie*, 1894, No. 8) reports a case in which a lightly asphyxiated child, after being restored by swinging, suddenly died, and a post-mortem revealed fracture of the inner third of the right clavicle. The broken bone had entered the first intercostal space, perforating the pleura costalis and lung. Pneumothorax and emphysema of the anterior and posterior mediastinal spaces, of the deep tissues of the neck and right chest were found.

Heydrich counsels against swinging in cases of fractured clavicle, and the writer agrees with him in the main, but asserts that swinging can be practised with perfect safety, even if the bone is broken; care being taken to secure the broken ends in such a manner as to preclude their being driven into the lung or pleura.

During the inspiration swing, the child should rest with its whole weight on the index fingers, which are in the axilla. In the expiratory position the infant should rest on the thumbs held before, and the four fingers which are loosely placed in the axilla and on the back. In no phase of the swinging is it correct to push the clavicles backward.

Alumnol, a New Antiseptic.

Heinze and Liebrecht (*Centralblatt für Gynäkologie*, 1894, No. 8) state that alumnol is an aluminium salt of the naphthol sulphur acids. It is a fine, white, non-hygroscopic powder, easily soluble in cold water. The authors believe it capable of deep as well as superficial astringent action. It has been tested in surgical, gynecological, and dermatological cases. In gynecological work, in the treatment of cavity wounds, after abdominal operations, etc., it is useful in solutions of 0.5 to 1 per cent. It is also useful especially in endometritis of gonorrhœal origin, as it attacks the gonococci deep in the tissues. Finally it is useful in colpitis, non-gonorrhœal in character, the strength being the same as given above.

Alumnol in Gonorrhœa.

Caspar and Sander (*Centralblatt für Gynäkologie*, 1894, No. 8) do not consider alumnol by any means a specific for gonorrhœa. In acute cases it is no better than those agents hitherto used, and in chronic cases they consider it inferior to nitrate of silver.

Gonorrhœal Affections in the Mouths of Newborn Infants.

Leyden (*Centralblatt für Gynäkologie*, 1894, No. 8) narrates a case of gonorrhœal affection of the mouth in a newborn child.

The mother of the child, an unmarried woman, presented herself when already in labor, having a vaginal discharge of a month's duration. The discharge was treated by daily washing out the vagina with lysol solution, and after applications for ten days the discharge ceased. The child when born was delicate and imperfectly developed. As soon as the head was born, both eyes were thoroughly washed with a solution of bichloride 1 : 7000. On the morning of the seventh day the right eye became inflamed, and the following night a yellowish pustule appeared on the inner surface of the upper lip. Abundant gonococci were found in the discharge. Later the left eye also became involved. After a few days the eyes and sore mouth gradually improved under a treatment of washes composed of bichloride solution 1 : 7000. In explanation of the infection of the mouth, it is quite possible that the child with its own hands conveyed the virus from the eyes during the incessant movements so common in young children.

A Case of Melæna Neonatorum.

Shütze (*Centralblatt für Gynäkologie*, 1894, No. 9) reports the case of a male child born of a healthy mother after a normal labor. The skull was found somewhat drawn after birth, and a tumor formed on the posterior part. During birth the cord was wrapped around the child's neck.

Three days after birth intestinal hemorrhage appeared, accompanied by loss of weight and symptoms of anæmia. The autopsy showed the stomach distended with gas, and containing a teaspoonful of liquid blood. The gastric mucous membrane was intact. The duodenum, jejunum, and upper half of the ileum were free from blood, but in the lower small intestine and colon were found fluid and clotted blood, although there was no break in the mucous lining. Under the tentorium cerebelli on both sides small effusions of blood were found resting on the dura and somewhat infiltrating the tissue.

Myomectomy during Pregnancy.

Stavely (*Johns Hopkins Hospital Bulletin*, 1894, No. 38) states that myoma complicating pregnancy is rather uncommon, on account of the tendency of this growth to cause sterility, or, in the event of pregnancy, early abortion. Virchow and Scanzoni state that fully 50 per cent. of women bearing myomata are sterile. If pregnancy occurs, notwithstanding the existence of this growth, the necessity for surgical interference must be considered, and depends upon the individual peculiarities of each case. Thus, a small myoma may not complicate the course of pregnancy or interfere with labor, no matter where situated. An interstitial myoma of the upper zone of the uterus, even though of considerable size, usually offers no mechanical obstruction to labor, and, unless symptoms arise which render an operation necessary, should not be touched. Tumors which are situated in the early months of pregnancy in the lower part of the uterus may gradually ascend from the pelvis and occupy such a position at term that labor is in no way complicated.

A pedunculated myoma blocking the pelvis and causing severe pressure symptoms may frequently be freed from its confined position by careful manipulation, and this may be accomplished more readily by placing the patient in the knee-chest position. Manipulation may either fail on account of the cramped environment of the tumor, or on account of the adhesions which bind it so firmly in the pelvis that attempts at separation may be attended by disastrous consequences, as the cases cited by Phillips and Handfield-Jones prove.

The dangers from surgical operation in these cases are shock, abortion, hemorrhage, intestinal obstruction, and infection. On the contrary, in non-interference, abortion, hemorrhage, sepsis, rupture of the uterus, pressure symptoms, intestinal obstruction, and mechanical obstruction to labor may occur.

The author draws the following conclusions from an analysis of the cases operated on: (1) Operations performed during the last eight years have been attended with much better results than in former years; (2) operations upon sessile myomata are more disastrous to the fœtus than are those of pedunculated tumors; and (3) myomectomy, for pedunculated or sessile myomata, is comparatively safe and thoroughly justifiable in properly selected cases.

Central Lesions at Birth a Cause of Melæna Neonatorum.

Preuschen (*Centralblatt für Gynäkologie*, 1894, No. 9) contributes an outline of his researches relative to the relation of lesions of the central organs

occurring during birth to melæna neonatorum. In repeated post-mortem examinations he had observed erosions of the gastric mucous membrane; hemorrhagic infarctions of the lungs, and at the same time tolerably extensive blood extravasations were present under the tentorium, on the cerebellum, crura cerebelli, ala cinerea or corpora quadrigemina, and once on the surface of the cerebral hemispheres. He was thus induced to make observations on rabbits. A solution of chromic acid was injected into portions of the brain to be examined, and thereby were obtained lesions accompanied by melæna. The infarctions in the lungs and stomach were not always associated. The gastric extravasations were sometimes the size of a pin's head, and although generally scattered, were mostly in the cardiac region, fundus, and great curvature, but were seldom found in the antrum pylori. In other cases the extravasations followed the vessels. Occasionally there were large, isolated extravasations, 1 to 2 cm. long and broad. In other experiments, pieces of sponges and laminaria were placed in various parts of the brain, and paraffin was injected between the brain surface and calvarium. The same results as in the former experiments followed in the stomach and lungs.

The literature of melæna gives 92 cases, with 51 deaths and 46 autopsies. Leaving out the older cases, to the third decennium of this century, 37 cases remain; of these only five give evidence of careful and complete examinations on the brain. In 31 the associated lesions were found.

GYNECOLOGY.

UNDER THE CHARGE OF

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The Pedicle in Hystero-Myomectomy.

Martin (*Centralblatt für Gynäkologie*, 1894, No. 16) in a discussion of this subject before the International Medical Congress, concludes his remarks with the opinion that total extirpation is the ideal operation, since it is fair to infer that the dangers to be feared from the operation are derived from the stump.

Mangiagalli thought that the influence of the stump upon the mortality of hysterectomy had been exaggerated, since the situation of the tumor (whether intra-ligamentous or not) has as much, or more, to do with the prognosis after operation. Zweifel's method, with the use of the elastic ligature, is the simplest and most rapid. The extra-peritoneal method is rarely indicated.

Jacobs believed that total extirpation is the ideal method, since it saves loss of blood, and consequently shock, especially if clamps are used. His plan is to secure the uterine arteries *per vaginam*, then to open the abdomen, to clamp the broad ligaments, and to remove the tumor, draining with gauze.

PÉAN believed that as soon as a fibroid of the corpus uteri of considerable size is recognized, it should be removed by cœliotomy without regard to its site, either by the use of the elastic ligature, forcipressure, or by morcellation; if of moderate size, the growth should be removed piecemeal *per vaginam*, with the uterus, the broad ligaments being secured with forceps.

LANDAU laid down the following rules: If the tumor is below the umbilicus, extirpate it piecemeal *per vaginam*; if larger, enucleate it as rapidly as possible, and remove the stump *per vaginam*; it is better not to close the peritoneal cavity, hence the advantage in using clamps.

CARLE, of Turin, affirmed that myomotomy is only indicated in cases in which the symptoms are urgent, such as profuse hemorrhages, persistent pain, and pressure effects. He reported one hundred and fourteen cases in which all the different methods were employed, with seven deaths, among which total abdominal extirpation was performed twenty times, vaginal hysterectomy eleven, and morcellation eleven with no mortality.

THE TREATMENT OF COMPLICATED PELVIC ABSCESS.

LANDAU (*Ibid*) summarizes his conclusions on this subject as follows: In all cases in which pyosalpinx is complicated with intra- and extra-peritoneal abscesses (with or without intestinal or vesical fistulæ), where extirpation by the vagina or by cœliotomy is impossible or too dangerous, the uterus and diseased adnexa can be safely removed through the vagina by means of clamps. If suppurating tubes and ovaries cannot be completely removed *per vaginam*, it is not proper to be content with the extirpation of the uterus alone, but cœliotomy should be performed. In uncomplicated cases of double pyosalpinx the uterus should be removed *per vaginam* with the tubes. Before proceeding with the radical operation, however, the fact of the existence of bilateral disease should be positively determined by an explorative incision, either vaginal or abdominal. If possible, a conservative vaginal operation should be done, adhesions around the adnexa being separated through an incision in the posterior fornix.

JACOBS, in discussing this subject, reported one hundred and eighty-four cases operated upon by the vaginal method, with only five deaths.

LEOPOLD stated that he was accustomed to perform cœliotomy in uncomplicated cases, but in cases complicated with fistulæ, where the patient had been bedridden for years, or where experience had shown that the uterus, if allowed to remain, would cause persistent trouble, he was accustomed to remove the organ with the adnexa *per vaginam*, using ligatures instead of forcipressure. He reported thirty cases, with only one death.

COMPLETE PROCIDENTIA IN THE NULLIPARA.

SCHRAMM (*Centralblatt für Gynäkologie*, 1894, No. 15), refers to the rare occurrence of this displacement in women who have not borne children, and especially in young girls, in whom it is nearly always of traumatic origin. He reports the case of a strong, muscular servant, aged seventeen, who had complete procidentia from unknown causes, with marked hypertrophy of the cervix. The cervix was amputated, and anterior and posterior colporrhaphy were performed, in addition to which it was necessary to excise a wedge-

shaped piece from the anterior aspect of the corpus uteri. The patient was discharged at the end of a month, with the uterus in normal position. From the history it was inferred that venereal excess, as well as severe manual labor, had been an active etiological factor.

[It is a question if shortening of the round ligaments, preceded by amputation of the cervix, would not give a more permanent result in such cases.—ED.]

THE CONSERVATIVE TREATMENT OF PYOSALPINX.

VUILLET (*Ibid.*) in opening the discussion on this subject, arrived at the following conclusions: In the majority of the cases a cure can be effected by puncture of the tube alone, or followed by incision and drainage, and is devoid of danger in skilled hands. He had had two cases of pregnancy in pyosalpinx thus treated, and therefore believed that it was the duty of gynecologists to adopt this conservative method before deciding to remove the adnexa.

POZZI affirmed that puncture was not curative in suppurative disease of the tubes; he favored the preservation of portions of diseased ovaries in order to render subsequent conception possible.

MARTIN agreed with the latter with regard to resection of the ovary, but favored also resection of the tubes. He stated that about one-fourth (!) of the patients whose diseased ovaries he had treated conservatively had subsequently become pregnant.

VAGINAL HYSTERECTOMY FOR DISEASE OF THE ADNEXA.

JACOBS (*Centralblatt für Gynäkologie*, 1894, No. 18) strongly urges the superiority of the vaginal over the abdominal operation for the removal of diseased adnexa, presenting his own statistics, showing a mortality of 2.7 per cent. in 184 cases, as compared with a death-rate of 5.7 per cent. in 1540 cœliotomies performed by various operators, including Martin and Tait. In 690 vaginal salpingo-oöphorectomies by other operators, including himself, the mortality was only 4.49 per cent. Moreover, it was formerly the practice to resort to the vaginal operation only in complicated cases in which cœliotomy was judged to be impossible—an additional argument to support his position that where removal of both tubes and ovaries is indicated the uterus should be removed at the same time. He denies the justice of the criticism that after the vaginal operation has once been begun it must be completed, since it is his practice to first open Douglas' pouch and to satisfy himself regarding the condition of the adnexa. If both are diseased, he removes them with the uterus, otherwise he performs unilateral salpingo-oöphorectomy.

ENCAPSULATION IN ABDOMINAL DRAINAGE.

FRANK (*Centralblatt für Gynäkologie*, 1894, No. 16) insists that subsequent observations have confirmed the opinion which he expressed in 1881, that drainage after cœliotomy is dangerous unless the diseased portion of the abdominal cavity can be completely shut off from the healthy. It is easy thus to isolate the pelvic cavity by utilizing the existing natural barriers, the

rectum with the meso-rectum and meso-colon, which can be drawn down over the raw surface. This barrier is fortified by the union of the appendices epiploicæ of the gut with the parietal peritoneum. In this way the coils of small intestine are prevented from coming in contact with the raw surfaces.

[The writer apparently overlooks those cases in which, on account of general adhesions, it is impossible to draw down the protecting barrier.—ED.]

THE SURGICAL TREATMENT OF INCONTINENCE OF URINE.

FRANK (*Centralblatt für Gynäkologie*, 1894, No. 16) describes the following successful operation for incontinence following parturition, presumably due to retroflexion with fixation: The anterior vaginal wall was incised from a point just opposite the beginning of the urethra, as high as the portio, and the posterior wall of the bladder was dissected away. A fold was turned into the bladder, so as to form a valve over the vesical opening, and was secured with catgut sutures. A cicatricial band, which extended across the vesico-uterine pouch, had previously been divided, and in order to prevent its re-formation a vaginal flap was brought over and sutured in its place. After the third day the patient was able to pass her urine naturally, and the incontinence was permanently relieved.

SCHULTZE (*Centralblatt für Gynäkologie*, No. 17) read a paper on "Urethral Incontinence" before the International Medical Congress, in which he advocated the following operation that he had performed successfully: In a patient with incontinence due to laceration and fistula of the urethra, he made a denudation in the shape of a horseshoe, including the fistula and extending as high as the neck of the bladder, uniting the apposed surface with numerous sutures of silkworm-gut. A catheter was left in the bladder for nine days, at the end of which time the sutures were removed, and there was perfect retentive power. The bladder being much contracted, its capacity was increased by hydrostatic pressure from four to six ounces.

THE RESULTS OF THURE BRANDT'S METHOD.

JENTZER (*Ibid.*) reports 114 cases, including various pelvic affections, from a review of which he deduces the following conclusions with regard to treatment during menstruation: If pelvic massage is practised during the menstrual flow it must be gentle and the sittings must be of very short duration, the movements being those which oppose congestion. At this time it often relieves pain, and, if carefully conducted, never causes inflammation. Metrorrhagia is relieved, pelvic exudates are more rapidly absorbed, and adhesions disappear more easily and rapidly. In general, if massage is suspended during the menstrual flow, the treatment must be much more prolonged.

SALPINGITIS NODOSA.

UNDER this name WERTHEIM (*Centralblatt für Gynäkologie*, 1894, No. 18) refers to the form of tubal hypertrophy described by Schauta and Chiari as the incipient stage of chronic salpingitis. The nodules were previously supposed to be true myomata of the tubes. They are always located near the uterine end, and are accompanied by evidences of perimetritis. In the

writer's case several nodules as large as walnuts were situated near both uterine cornua. The distal ends of the tubes were occluded and their ampullæ were filled with pus. On section the nodules were found to be small abscess cavities communicating with the uterus by minute openings, but having no connection with the lumen of the tube. It seemed as if the nodules had been formed by the shutting off of crypts in the mucosa and by subsequent purulent change in their originally clear serous contents. Through the coalescence of several adjacent follicles a large pus cavity would thus be formed.

Operation for Ectropion of the Bladder.

Rein (*Centralblatt für Gynäkologie*, 1894, No. 17) describes an ingenious operation which he performed successfully for this condition. With the patient in Trendelenburg's posture, he first made a long abdominal incision, pushed the uterus and left tube and ovary aside, and introduced a sound into the left ureter. Another sound was inserted into the rectum and the tips of the two instruments were approximated. An incision was made in the ureter at a point opposite to the tip of the sound, and also in the rectum. A glass tube was inserted into the ureter, and to it was attached a piece of rubber tubing, the other end of which was carried through the rectal opening. The corresponding openings in the ureter and rectum were then united by two layers of silk sutures. The same procedure was adopted on the right side. The bladder was then extirpated *in toto*, after which the patient was lowered to the dorsal posture and the vesical arteries and their branches were ligated and the abdominal wound was closed. The operation lasted three hours.

Surgery of the Ureters.

Schauta (*Centralblatt für Gynäkologie*, 1894, No. 17) reports the following case of nephrectomy for uretero-vaginal fistula: The patient, aged seventy-one years, had carcinoma, involving the cervix and nearly one-half of the posterior vaginal wall, the uterus being fixed by parametric exudates, which were not thought to be malignant. On account of the extent of the disease the sacral operation was performed, the patient making a good recovery, but she was discharged with a uretero-vaginal fistula. She was readmitted, and it having been determined, by endoscopy and catheterization, that the left kidney was normal, and that the fistula could not be located in the cicatricial tissue at the site of the former wound, it was decided to extirpate the left kidney, which was done successfully, the patient being discharged well on the eighteenth day. Microscopical examination of the specimen showed limited foci of fatty degeneration in the cortex, with round-cell infiltration and localized desquamation of the tubal epithelium.

Penrose (*Kansas City Medical Index*, 1894, No. 5), in performing abdominal hysterectomy for carcinoma of the uterus, with an extensive infiltration in the left broad ligament, was obliged to excise an inch of the left ureter in order to remove all the diseased tissue. After removing the uterus and suturing the peritoneum over the vaginal opening, he ligated the distal end of the ureter and implanted the proximal end in the bladder according to Van Hook's method. The abdomen was closed without drainage, and the

patient made an uninterrupted recovery, passing thirty-eight ounces of urine on the fourth day, and being discharged on the twentieth. A similar case has been reported by Kelly.

[Comparing these two cases, it would seem as if the plan adopted in the latter was by far the more rational and scientific. The recovery of such an aged patient after extirpation of the kidney must be regarded as decidedly exceptional, and in no respect justifies the performance of such a radical operation, especially as the kidney seems to have been only slightly diseased.—Ed.]

Histogenesis of Endometritis.

Amann, Jr. (*Ibid.*), from a study of tissue removed with the curette, is disposed to believe that the condition usually described as chronic endometritis partakes more of the character of a neoplastic than of an inflammatory formation. In so-called "interstitial" endometritis he found marked karyokinesis of the cells of the mucosa and of the endothelium of the smaller bloodvessels, with only a small amount of chromatism. The extensive proliferation of the cells lining the capillaries causes a certain friability of the vessel walls, which explains the tendency of hemorrhage. The surface epithelium in the so-called "glandular" form of endometritis shows little, if any, tendency to proliferate. In another variety of the condition the proliferation seems to be almost entirely confined to the superficial epithelia, though it may affect the deeper layers and lead to the gradual formation of squamous epithelium (*psoriasis uterina*). Leucocytes were found undergoing segmentation, not only in the lymph- and bloodvessels, but in the mucosa. The writer concludes that the general disposition of the cells to karyokinesis and their poverty in chromatin in chronic endometritis is by no means an evidence of malignant degeneration, as might at first sight be inferred.

PÆDIATRICS.

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OF PHILADELPHIA.

Œdema Neonatorum.

Semet (*Thèse de Paris*, 1893; *Revue des Mal. de l'Enfance*, April, 1894, p. 214) states that œdema neonatorum is still often confounded with sclerema—an unfortunate error, because the latter disease is almost always fatal, while the former, though grave, is susceptible of cure. Œdema neonatorum

appears especially in feeble or premature children, when subjected to bad hygienic conditions and exposure to cold, and its chief causes appear to be feebleness of the right heart and weakness of the respiratory muscles. Thoracic aspiration is thus diminished, and hence follows engorgement of the cardiac chambers, of the vessels, and especially of the veins. Œdema usually begins in the first three or four days of life, though it may not appear for several weeks or even months. In all cases before the appearance of œdema, the infant refuses the breast and cries incessantly.

Most frequently the œdema appears first in the lower extremities and gradually extends upward, involving the face and back last; generalized œdema is, however, very rare. Occasionally the arms and face are the first parts affected. The skin, which at first was pale, now becomes red or even violaceous; upon the face and extremities it is cyanosed. At the same time the surface becomes firmer to the touch, and pitting, which at first was easily produced, becomes more difficult to bring out as the infiltration increases; and now movement of the limbs may be impeded, but immobilization of the joints and rigidity of the body, as seen in sclerema, are never observed.

The skin is cold and the thermometer registers a very low temperature, 93° to 95° F. In some cases extraordinary temperatures have been noted: Henning has observed 71.6°, and Letourneau mentions 68° F. A. Robin states that the axillary temperature is always equal to the rectal, if not higher than it.

Unless the œdema affects a wide area recovery may result after four or five days or more. Henning has seen it after seventeen days. The treatment consists in improved hygienic conditions, a tonic regimen, and warmth to the surface. Pulmonary and gastro-intestinal complications, which are frequent, are most to be feared.

In sclerema also there is feebleness; small pulse, sometimes scarcely perceptible; low temperature, and in some cases alteration in the elasticity of the skin; but here the back and shoulders are first affected, and the legs last, while the skin is hard and cannot be pinched up, nor does it pit on pressure. Sclerema rapidly progresses, and the hardening of the skin produces absolute immobility resembling cadaveric rigidity. The lips and face may be so affected that nursing is impossible, and thus the prognosis is very grave and the course of the disease very rapid.

Cystitis due to the Colon Bacillus in the Course of Vulvo-vaginitis in a Child.

Haushalter (*Revue Médicale de l'Est*, 1894, No. 6, p. 171) relates the history of a girl of six years, in whom, during the course of an intense vulvo-vaginitis with abundant yellowish-white discharge, symptoms of severe cystitis appeared. Micturition was frequent and painful, and slight tenderness was elicited by pressure over the hypogastrium. The urethra appeared healthy and no pus could be expressed from it. The urine was normal in quantity, contained no albumin or casts, but deposited a thick layer of pus. Bacterological examination of urine collected so as to avoid external contamination showed the bacillus coli communis. Under a milk diet, rest in bed, and salol administered internally, amelioration was rapid and the cure complete in three weeks.

The Tenacity of Diphtheritic Virus.

Belfonti (*Riforma Med.*, March 23, 1894; *British Med. Journal*, May 5, 1894) records a fatal case of diphtheria in a child, in which cultivation of the membrane showed the presence of Loeffler's bacillus and a streptococcus. The interest in the case lies in the fact that the infection seems to have been traced to a brother who had survived an attack of the disease seven months before. After the fatal termination of the second case, an examination of the pharynx of the other child revealed a chronic follicular tonsillitis, with chronic indolent enlargement of the cervical glands. Exudation from the tonsil showed the presence of the same microbes as were found in the fatal case, and extremely virulent cultures of the Loeffler bacillus were obtained. A second examination, three months later, showed that the bacillus was still present, but in a state of great attenuation, giving rise only to slight local inflammation when inoculated into susceptible animals. In the case of the surviving child, immunity had, of course, been secured by his attack; but for seven months after his illness he continued to carry in his throat and its secretions a germ of extreme virulence, which had brought about the death of his sister after that interval, and still continued to be a menace to others, in decreasing degree, for several months longer. The importance of rigid disinfection and even bacteriological examination of the secretions of the throat, before a patient is allowed to mix with healthy people, is pertinently emphasized by this interesting observation.

A Diastolic Bruit at the Apex in the Heart Disease of Children.

Theodore Fisher (*British Medical Journal*, April 28, 1894, p. 906) calls attention to a diastolic or sometimes presystolic sound not infrequently heard at the apex in association with a dilated heart. Donkin, in his *Diseases of Children*, notes a well-marked example in a child of eight years, "where a loud and long diastolic murmur, as well as a systolic, was always heard at the apex, but the necropsy showed a mitral orifice of fully three inches round, and no lesion other than a few small granulations on the auricular surface."

Fisher refers to the post-mortem records of thirteen cases of adherent pericardium in children who died in Guy's Hospital during a period of seven years, and in the clinical histories of five of these a diastolic or presystolic bruit had been present at the apex, yet the necropsy showed that the mitral orifice was dilated and the aortic valves were not thickened. Whatever explanation may be brought to explain this sound, the author observes, the fact remains that the bruit did not point to stenosis of the mitral valve. In three of these cases, as in another case under the care of Dr. Wheaton, in the Royal Hospital for Children and Women, a systolic thrill was noted—another confusing element if the heart was beating so rapidly that the exact time of its occurrence could not always be easily ascertained. Cheadle has noticed the frequency of a diastolic sound in the early endocarditis of children, and states that, although it may disappear, it generally develops into the presystolic bruit of mitral stenosis. Fisher suggests that this diastolic sound may indicate temporary dilatation of the heart. The sound heard in the diastolic

interval in association with a dilated heart, may be either a sound separated by an interval both from the second or the first sound, or it may be a low-pitched presystolic rumble, which may also alternate with a diastolic sound. The presystolic rumble of a dilated heart is probably too low pitched to give much difficulty in diagnosis, and when changed for a diastolic sound the accentuation and rhythm may be that of the *bruit de galop*. But there is, he believes, a diastolic murmur heard in the dilated heart of children which is presumably due to that dilatation and is indistinguishable from the diastolic sound of mitral stenosis. It may be best heard at the impulse or just outside, or over the right ventricle in the third and fourth or fourth and fifth intercostal spaces. In one position it is probably produced in the left ventricle, in the other in the right. In the same heart it may sometimes be best heard in one position, sometimes in the other, and then points probably to general dilatation. Whether such a murmur indicates mitral stenosis or dilatation of the heart is a question of some importance. The most common cause of dilatation is adherent pericardium, and death from this condition is much more common in children than from mitral stenosis; so that the immediate prognosis of a diastolic sound indicating a dilated heart is much graver than that of one pointing to mitral stenosis.

The Coexistence of Infectious Diseases.

Caiger (*British Medical Journal*, May 5, 1894, p. 969), at a recent meeting of the Epidemiological Society, presented a study on the coexistence or close succession of two or more infectious diseases in the same individual. His experience at Stockwell, he said, had satisfied him that such concurrence of infections was as frequent as mere probabilities would explain, and that, so far from affording protection against other diseases, some certainly increased the susceptibility thereto. In the last four years he had seen 362 cases of two and 17 of three diseases running some part of their courses concurrently; in 200 of these the acute febrile stages of two or three coincided. The priority of the several diseases was calculated from their known incubation periods. The primary disease was scarlatina in 197, which was complicated by diphtheria in 97 cases; varicella, in 43; measles, in 31; whooping-cough, in 13; erysipelas, in 10; enteric fever, in 2, and typhus, in 1. Scarlatina was a complication in no fewer than 88 among 97 in which the primary disease was diphtheria; in 20 among 23 of varicella; in 14 of 17 of whooping-cough; in 6 of 9 of enteric, and 9 of 18 of measles, though here diphtheria accounted for another 7. Among the 17 triple attacks scarlatina was the primary disease in 9, and a complication in 4 only, diphtheria holding the highest place with 9. During the past six years 48,367 cases of scarlatina had been admitted into the hospitals of the Asylums Board; of these 3166, or 6.54 per cent., were complicated, 1094 with diphtheria, 899 with varicella, 703 with measles, and 404 with whooping-cough; the relative numbers of diphtheria and whooping-cough being probably owing to the fact that many had already had whooping-cough in infancy, while diphtheria, though less frequent, might and often did recur: these four diseases accounted for 3100, or all but 66. The questions suggested by these figures were: (1) Did any disease render the individual less or more susceptible to infection by another? (2) Did the

primary disease in any way influence the course or character of the secondary one as regards (*a*) incubation, eruption, etc., periods; (*b*) severity of the disease; (*c*) distribution of local phenomena; (*d*) liability to sequelæ and other complications? The conclusions at which he arrived, after eliminating the influence of age incidence, seasonal prevalence, actual frequency, etc., were, first, that there was no such thing as antagonism between any, but rather the reverse, increased susceptibility being brought about, generally or locally; that is, first, by the lessened power of resistance induced by a disease attended with grave constitutional disturbance; and, secondly, by the local inflammations facilitating the development of the contagia of diseases known to affect the mucous membranes or tissues in question. Thus, an attack of varicella exerted no influence on any that might follow, but when scarlet fever was the primary disease, varicella, favored also by the quasi-dermatitis left behind, might rival unmitigated smallpox in intensity of fever and extent of eruption. Scarlatina was frequent and dangerous after diphtheria, but diphtheria following scarlatina was still graver, since the scarlatinal throat, teeming with staphylococci and streptococci, was a perfect soil for the bacillus of Loeffler. So, too, while the general phenomena of measles might be aggravated by previous diphtheria or scarlatina, and in the latter conjunction the rash would be intensified, an attack of diphtheria following on measles was even graver than the post-scarlatinal, since it inevitably attacked the larynx and trachea, and tracheotomy was very rarely of any avail. Measles and whooping-cough were known to follow one another or to coexist, mutually increasing the susceptibility of the individual. The author had never found the incubation period of a disease affected, but the presence of scarlatina accelerated the appearance of the rash in measles by a couple of days.

Measles complicated by Subcutaneous Emphysema.

Varnali, of Bucharest (*Revue mensuelle des Maladies de l'Enfance*, May, 1894, p. 266), reports such a case occurring in a child of ten years. The patient, when seen with the disease in full eruption, presented over the whole trunk and neck a subcutaneous emphysema; over the præcordial region there was a gaseous tumor the size of an orange. The disease was of four days' duration, and was uncomplicated by broncho-pneumonia; the emphysema had appeared suddenly after a paroxysm of coughing, followed by vomiting. The child had had an attack of whooping-cough about seven or eight months previously.

The author discusses the question of causation to explain how in the violent convulsive paroxysms of a whooping-cough the accident had failed to occur, but had followed a simple attack of catarrhal cough of measles several months later. He offers the following hypothesis: that the microbe of measles, whether that of Babes or another, had produced in the bronchial vessels a congestion and diapedesis, and that this lesion had caused atelectasis of some pulmonary lobules, with vicarious emphysema of other lobules. In the case of the patient, the old lesions left by his whooping-cough, in conjunction with the new, had produced a high intra-pulmonary tension, whence the rupture of a vesicle near the hilum and the production of the subcutaneous emphysema by way of the anterior mediastinum.

This explanation is in accord with the theory advanced by Barthez and Sanné concerning the production of atelectasis by congestion of the interlobular vessels, in opposition to the theory of Gärtner and Virchow—the theory of the ball-valve.

The Operative Treatment of Cold Retro-pharyngeal Abscess in the Child.

Contrary to the teaching of Etienne, Watson, Cheyne, Burkhardt, and Phocas, who prefer, for the child as well as for the adult, opening through the neck, Rochard (*La Médecine Infantile*, January 15, 1894) advises an incision through the pharynx, and examines the objections which have been made to this plan of treatment. The hemorrhage is always moderate when the incision is in the median line, and wounding of the displaced carotid would not be possible except when the abscess was not median, but to the side, a condition demanding different treatment. The irruption of pus into the air-passages can be avoided, after incision, by rapidly turning the child's face downward. The difficulties in getting the mouth open and making the incision are easily overcome with a little patience. The principal objection remaining refers to the danger of local infection, which has especially prompted operation by an external incision. But despite the proximity of a focus of infection like the buccal cavity, accidents (detachment, purulent infection) can be scarcely said to occur, so rapid in the child is the cure of a cold abscess opened at the proper time. Opening by way of the neck, on the other hand, requires a most delicate and dangerous operation, which should not be employed except when the abscess is prominent in the neck or when it is very large.

The Association of Urticaria with Rickets and Dilatation of the Stomach.

According to Comby, urticaria in children frequently accompanies rhachitis and dilatation of the stomach. This view has received confirmation from a study by Funk and Grundzach (*Monatsh. f. prakt. Dermat.*, Feb. 1, 1894), who submitted forty-five children suffering from urticaria to a careful clinical examination, and in all cases found symptoms of rhachitis, such as frog-belly, head sweating, deformity of the thorax, etc., as well as the physical signs of a dilated stomach. To determine the existence of dilatation the authors employed the method of auscultation by stethoscope applied over the epigastrium while the limits of the stomach were being marked out by percussion. In this way the differences of sound emitted by the stomach and the intestines are very clearly appreciable, each percussive stroke over the region of the stomach transmitting to the ear a peculiar succussion, which is completely absent when the intestine lies beneath.

This method of "auscultatory percussion" has shown in children affected with urticaria and rhachitis, with chronic dyspepsia, that the inferior limit of the stomach descends, after ingestion of liquids, to the level of the umbilicus, or even one or two centimetres below—a manifest sign of gastro-ectasia; while with children free from digestive trouble this limit remains always six or seven centimetres above the umbilicus after ingestion of food.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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"Sporozoa" and Carcinoma.

From time immemorial the causation of tumors has been shrouded in obscurity. Theories of their origin have from time to time sprung up, but each has in turn proved unsatisfactory in some one or more particulars, and has been discarded in consequence. What more natural than at the present time, when disease after disease is being shown to depend upon the invasion of the body by living organisms, a similar causation should be suggested for the malignant tumors, particularly as in some few respects they bear a slight resemblance to some phenomena of the infectious diseases? Bacteria were first sought, but no etiological relationship has ever been shown between those occasionally found and the tumors in which they occurred, and this, with the distinct fundamental differences between the tumors and diseases of bacterial origin, has brought about a general belief that if tumors are dependent for their origin upon the growth in the body of living organisms, those organisms are of a nature different from the bacteria.

In 1889 Thoma and a number of other observers discovered small bodies in epitheliomata, whose rounded shape and general appearance suggested their relationship to several of the protozoa occasionally parasitic in man and some of the lower animals. So great was the interest awakened by these observations, that during the succeeding four years more than one hundred and twenty separate articles made their appearance upon the relation of these bodies to carcinoma alone.

It is manifestly impossible for us here to pass in review such a mass of literature, but we would call attention to an able summary of it by Stroebe, in the *Centralblatt für allgemeine Pathologie und pathologische Anatomie*, 1894, v., Nos. 1–3, and to a few of the conclusions reached by him after a careful review of the whole.

The bodies in question are spheroidal or irregular in shape, and have been found in and between the epithelial cells. They are stained somewhat irregularly by the aniline dyes. Occasionally the appearance of a nucleus is present, but usually they appear to be simply irregular masses of protoplasm, usually rather homogeneous in appearance. They have been described both in the cell body and in the nucleus of the epithelial cells. Their resemblance to certain developmental forms of the sporozoa has fastened this name upon them.

Despite the critical study which has been given to the relation of these bodies to carcinoma, the only argument in favor of accepting them as the exciting cause of cancer rests upon their morphological resemblance to psorospermia

and to the corpuscles of molluscum contagiosum. The difficulties in the way of this view are, on the other hand, both numerous and weighty. The great irregularity in size and shape of the bodies described, and the diversity in the staining quality and in the nature of the substance composing them, make it evident that a number of quite distinct entities have been described by different authors. Some of these differences might be explained by the discovery of a definite life-history passing through several forms, but all efforts to develop such have failed. Nor has anyone been able to detect any motion, growth, or change of any kind indicative of life in the so-called sporozoa, and all attempts to cultivate them outside the body on appropriate culture media have failed. Without cultivation on artificial media and subsequent inoculation with the production of carcinoma as its result, the proof that they bear an etiological relation to the tumor must be imperfect, for even granting that they are living sporozoa they might equally well be harmless parasites which had found entrance through ulcerations or otherwise to the carcinomatous tissue. It is true that a few attempts to inoculate carcinoma from one individual to another have succeeded, but in all of them a considerable portion of tissue was transplanted.

The weight of evidence seems to point, then, to the "sporozoa" as nothing more than degeneration products of the epithelial cells. This view is held by the majority of those who have studied them, and is supported by the irregular shape and occurrence of the bodies, by the well-recognized tendency of the cells of carcinoma to undergo degenerative changes, by the more abundant occurrence of the bodies in the medullary variety of carcinoma in which the degenerative changes are most frequent, and in the epitheliomata (flat-celled carcinomata) of the skin in which more or less ulceration and degeneration have been present.

The nature of the degeneration is undoubtedly different in different cases. Some of the appearances are explained as the result of degeneration of the nucleus, some as the result of degeneration or vacuolation of the cell body, and some as the result of penetration of leucocytes, red corpuscles, or other cells into and between the bodies of dead or degenerate cells of the tumor.

Stroebe concludes that, while a possible parasitic origin of carcinoma cannot be definitely denied, there is as yet no positive evidence whatever in favor of such a view.

Bacterial Fever: its Antitoxin.

Centanni and Bruschettini (*Deutsche med. Wochenschr.*, 1894, No. 12, 270) have continued the investigation into the cause of the fever of infectious diseases begun by the former (cf. The Journal, June, 1894, p. 743), devoting their attention particularly to the induction of immunity to the pyrotoxic effect of the bacterial poisons and to the antagonism of the blood serum of immunized animals to the fever of infectious diseases.

His earlier experiments having convinced Centanni of the identity of the fever-producing element of all pathogenic bacteria, he selects for his experiments upon immunity to it the serum of rabbits immunized to the effects of the influenza bacillus. Injection of this serum prevented the pyrotoxic effect of injections of the "pyrotoxina bacterica," prepared from several distinct

species of bacteria, and allayed fever which had been produced by previous injections of the pyrotoxin. The same result was obtained when fever-producing bacteria of various species were inoculated. Furthermore, the antipyretic and protective action of the blood serum of immunized animals was found to last for a considerable time after the injection.

If further experiment shall confirm these results they are of great importance, for they are confirmatory of the idea advanced by Centanni in his former paper, that the fever-producing factor of the bacterial poisons is the same in all species, and they suggest that in the treatment of the fever of infectious diseases the blood serum of animals made immune to the pyrotoxic action of any species of bacteria may prove a most valuable therapeutic agent, not only by lowering the temperature but by ameliorating the general condition of the patient. The authors are now testing the correctness of this inference upon patients suffering from febrile diseases.

Pneumaturia.

Heyse (*Zeitschr. f. klin. Med.*, 1894, xxiv. 130) records an interesting case of gas-formation in the bladder of a patient suffering from myelitis with retention of urine. After catheterization had been practised for some time, gas was noticed to escape through the catheter, and percussion elicited a tympanitic note over the bladder. The autopsy not long afterward disclosed gas in considerable quantity in the bladder, ureters, and in the substance of the kidneys. Cultures showed the presence of a short bacillus resembling in all particulars, except its virulence in animals, the bacterium lactis aërogenes of Escherich. Introduced under the skin, into the joints and pleural and abdominal cavities, and in artificial cultures, its growth was always accompanied by gas-formation. It is believed by Heyse to have been introduced with the catheter into the bladder in his case, and to have been the cause of the pneumaturia.

Peptonuria.

The occasional occurrence of peptone in the urine has long been recognized, but its exact diagnostic and prognostic importance has been uncertain. With a view to throwing some light upon this subject, Robitschek (*Zeitschr. f. klin. Med.*, 1894, xxiv. 556) has examined carefully the urine of 121 patients suffering from various disorders, with the result of finding peptone in the urine in 60 of them. He believes that peptonuria occurs physiologically only during the puerperium, and that its occurrence at any other time is to be regarded as pathological. As a rule, it is indicative of tissue degeneration, as the result of which peptone finds its way into the blood and is excreted by the kidneys. The mere presence of the peptone in the blood and in the urine seems to have no special symptoms associated with it, and as it occurs in a great variety of conditions of which tissue-degeneration is a part, its diagnostic significance is thought to be but slight.

The Etiology of Acute Articular Rheumatism.

A number of the clinical features of acute articular rheumatism have suggested to the minds of many the probability that it belongs to the ever-growing class of infectious diseases. Its acute onset and febrile and self-

limited course, its complications, and the frequent involvement of the joints as a complication of many infectious diseases, are regarded as supporting this theory. The careful investigation of a typical case of the disease by SAHLI (*Deutsches Archiv f. klin. Med.*, 1893, p. 451), has added the evidence of the bacteria themselves. Endocarditis, pericarditis, and pleurisy were associated with the joint lesions. There was no suppuration. Bacteriological examination disclosed the presence in all the lesions of a micrococcus, identical morphologically and culturally with the staphylococcus citreus, but of very low virulence when inoculated into animals as compared with it. As there was no ground to suppose a mixed infection in this case, Sahli regards this germ as its exciting cause. He is in doubt whether the germ discovered is a distinct species or whether it is merely a staphylococcus citreus of degenerate virulence. He is inclined to the latter view because of the frequent association of rheumatism and endocarditis, whose intimate relationship to the pyogenic cocci has been repeatedly shown.

A note appended to the report of this case states that in several other cases more recently examined, similar cocci of low virulence have been found.

THE RESISTANCE OF TYPHOID BACILLI TO DRYING, AND THE POSSIBILITY OF THEIR DISSEMINATION THROUGH THE AIR.

UFFELMANN (*Centralbl. f. Bakteriol. u. Parasit.*, 1894, xv. 133) has investigated the power of the typhoid bacilli to resist drying when mixed with earth, sand, cloth, and other similar substances which might be soiled by the dejecta of typhoid patients. Small portions of these substances, after being sterilized, were infected with bouillon cultures of the bacilli, and were set aside in the shade and kept at the ordinary room temperature. After a variable length of time nutrient gelatin was inoculated with small portions of the various substances. In this way the bacilli were found to have survived drying in garden earth for 21 days, in sand for 82 days, in sweepings from the house and the street for 30 days, on linen for 60 and 72 days respectively, on buckskin for 80 days, and on wood for 32 days. Uffelmann distinctly states that these numbers are not to be taken absolutely, for under somewhat different conditions of moisture of the atmosphere or of temperature, the viability of the bacilli might be quite distinctly longer. At all events these experiments show the power of the typhoid bacilli to resist drying for a very considerable time, and they suggest the possibility of the dried bacilli being blown about in dust from the room or clothes of those suffering from the fever, and of thus infecting milk, water, or other foods. Uffelmann thinks it very questionable whether the disease can be set up by bacilli drawn into the lungs in respiration.

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